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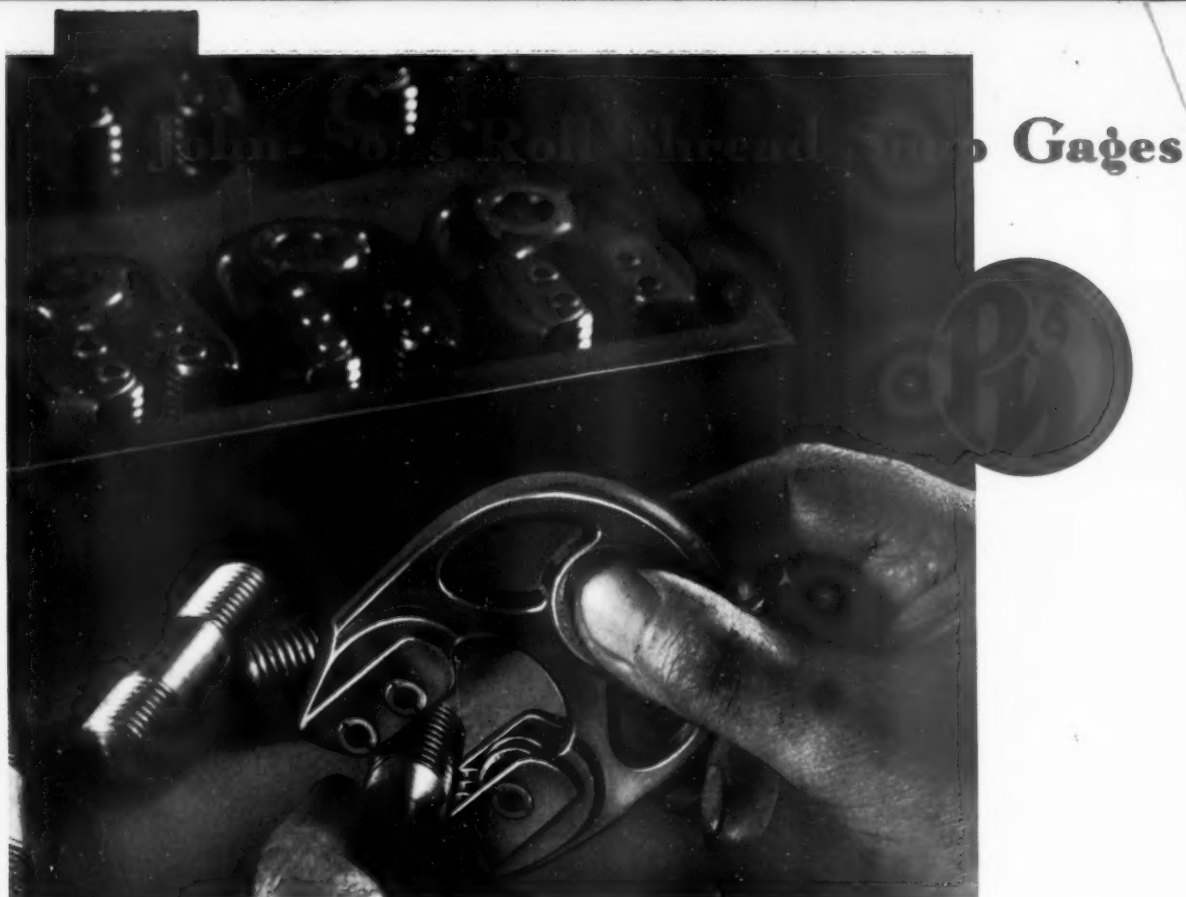
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Vol. VI

MAY, 1937

No. 1

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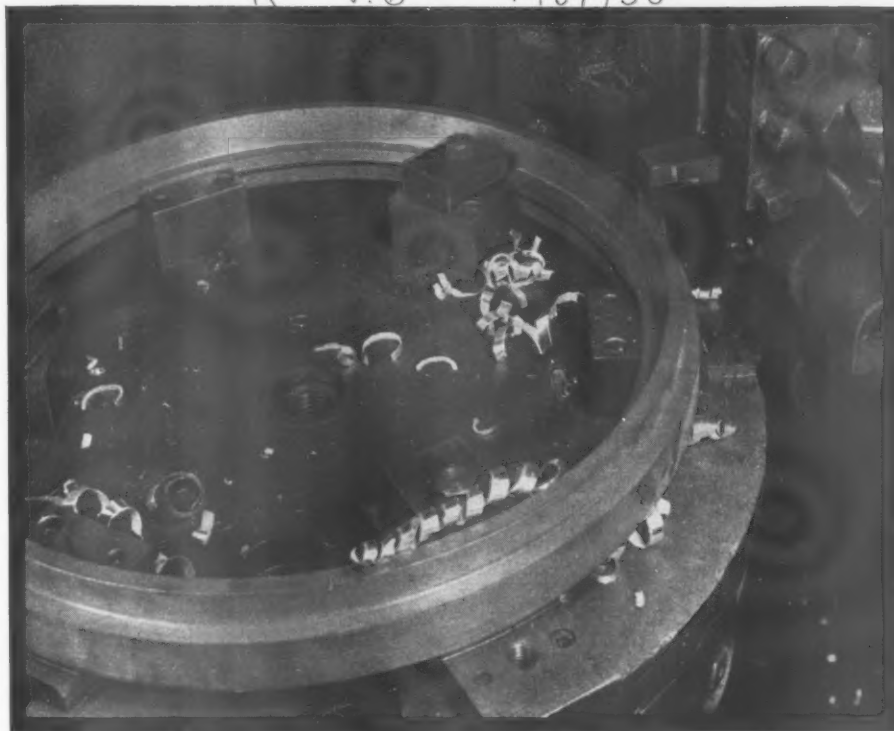
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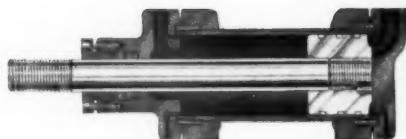
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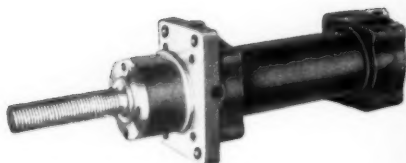
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GAGES AND GAGING

J. P. deMONTIGNY, Technical Editor

WITH INTRODUCTION

By

A. E. RYLANDER

IN this issue, we present several interesting articles on gaging. Many contributions, however, were omitted due to similarity of context; to publish each would have been near repetition. Incidentally, several makes of dial indicators are closely parallel in structure and use, this also being true of plug and ring gages. We wish, here, to acknowledge contributions from C. G. Gilbert, of the Federal Products Corporation, W. H. Scheer of the Swedish Gage Company of America, W. W. Burden for the Sheffield Gage Corporation and others whose material we could not use because of the reasons stated. We do, however, effect a near compromise by embracing these gaging systems in this introduction. We appreciate the observations on gaging by Frank Price, Gage Engineer of Chrysler Corporation, which is included in this issue.

Measurement, which antedates human history, has been a factor in making history. The pyramids, reared forty centuries ago and built to scale; the hanging gardens of Babylon, the Tower of Babel and the Ark all have references to accepted standards of measurement, as did the civilizations of the Incas and Mayas. Hellenic Greece and Imperial Rome had both developed measurement to a science, although in nowise to the exactitude known today. Nor, for that matter, have we done more than penetrate the ultra-precision of future gaging.

The early machinists of this Machine Age used rules, inside and outside calipers; the human factor, however, precluded the precision necessary for interchangeable manufacture. Then, about fifty years ago, Brown & Sharpe brought out the micrometer caliper.

The Vernier caliper also found many applications, as did the amplifying gage, first a simple device employing the reverse leverage principle, then evolving into the segment dial type, as the Koch indicator which appeared around 1907. Later, various designers refined this to the dial indicator, an instrument of wider range and precision. It is the writer's belief that Waltham Watch Tool Co. produced the first dial indicator; later, Ames and Federal Products developed several variations for divers applications. By refinement of gearing and research into improved materials, these companies have produced instruments of reliability and broadened scope. Federal Products was perhaps the first to employ dial gages for checking cylinder bores; at least, the writer recalls discussing this system with their Mr. Carpenter some 17 years ago.

To provide a reliable and accurate method of checking internal diameters, the Swedish Gage Company developed a unique measuring head for an internal indicator, whereby the gage could be set directly from Johansson Gage Blocks. Prior to this development, internal gages were set with master rings. Combining this feature with a very sensitive amplifying mechanism employing adjustable knife edges and levers, they produced a gage which could be used in the manufacture of master ring gages as well as for production inspection of precision parts.

Of rather unusual design, the reed mechanism of the Sheffield Gage uses a light beam for amplification; this, of course, magnifies tremendously. Light, by the way, is a coming factor in various kinds of gaging. It may be of interest that, in precision form tool manufacture and particularly in gear tools, the light space is considered. There are, of course, electrical systems so sensitive that they respond to one's breath; a fly alighting on the heavy arm of some gages set up violent oscillations. It is a wide and interesting field, embracing pneumatics and hydraulics, electricity and magnetism, light and darkness, gearing and leverage—every principle used in mechanics and physics. And, the field is barely cleared for action.

GAGES - THEIR FUNCTION and APPLICATION

by

Clinton V. Johnson
PRATT & WHITNEY
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AFTER all, it is hardly reasonable to expect that outside of the limited sphere, comprised of comparatively few, besides gage manufacturers themselves, there exists a valid reason or requirement for a specific interest in the subject of gages.

In this article, therefore, reference to the interesting—even romantic—historical aspects of gages and precision measurement is avoided, and discussion of such involving and allied details as metallurgy, design, accuracy, and other factors is minimized.

We shall concern ourselves primarily with the consideration of the function and application of gages—emphasizing the economics rather than the mechanics of gaging.

What Is a Gage?

An effective approach to this subject, undoubtedly, is through the establishment of a definition for

"gage." One commonly held is this: "A gage is a device for determining accuracy and interchangeability."

In this broadly accepted opinion that the purpose of a gage is largely to determine accuracy and interchangeability of component parts, it should be recognized that its usefulness is definitely limited to a mechanical function. In its capacity under this interpretation the gage has an influence on very little beyond the accuracy and quality factors of the product it gages.

The importance of quality control is not to be discounted to the slight-

est extent; however, the problem of price, i.e., cost of manufacture, is of equal importance to every enterprise in its battle for survival in competitive markets. The inference is simply this: gages have an equally direct and important influence on the price of the product as well as on its quality.

This broader conception of the function of gages is being increasingly embraced and has resulted in a new definition of "gage":

"A gage is a device to improve quality, facilitate production, and reduce cost."

This changed conception and a more complete understanding of the function of gages has resulted in pronounced advancement in the accuracy, design and intelligent use of gages. Gaging progress has received additional stimulation from the unavoidable impositions placed upon gages (they are sometimes characterized as dimensions in physical form) by the engineering trend toward reduced product tolerances and demands for superaccuracy which tax the utility of available manufacturing equipment and operator skill alike.

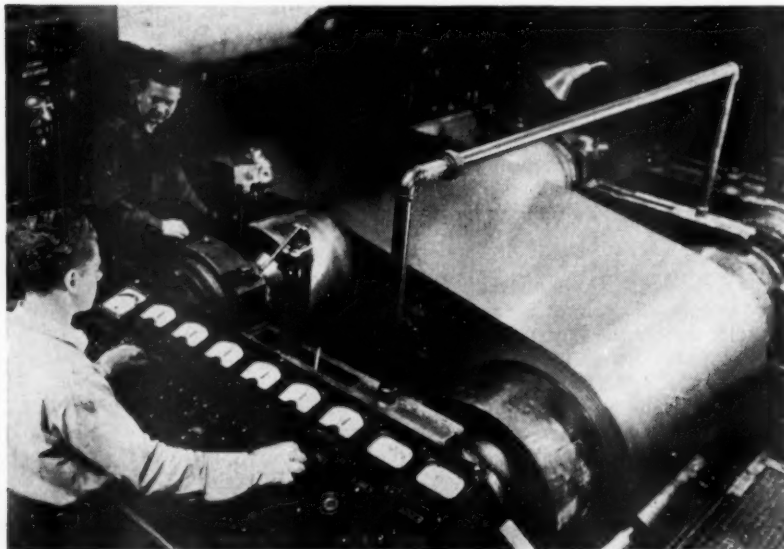
Assuming that the reader is in agreement with the modern and more inclusive definition of the function of gages, it follows that gages lose much of their independent identity and become auxiliary equipment—tools, as it were—whose only true purpose in the manufacturing program is to contribute their share toward improving the quality of product and reducing the cost of manufacture.

That gages serve the purpose for which they are intended, has been conclusively demonstrated on several industrial fronts. It should be definitely understood, however, that the degree to which they serve their purpose is directly proportional to the importance with which the gaging problem is regarded and the intelligence and courage which has characterized its disposition.

FIGURE 1.

Mammoth rolling mills are now operated from "control pulpits" which facilitate maximum operating efficiency thereby increasing the quantity and quality of finished product at the same time reducing its cost of production.

The Continuous Gage is shown "riding" the strip, and the thickness is indicated on the micrometer dial in the upper left hand corner of the panel board.



This leads to a situation which should be recognized—and the execution of which should be provided for. Gages and their application are not an inconsequential detail—an afterthought in a tooling program to be "disposed of" by a subordinate. The gage layout should be given equal consideration to any other phase of the tooling program, and the individual responsible for it should be intimately familiar with the specifications of the part-production, accuracy, manufacturing methods, functional requirements, service factors, etc. His viewpoint should reflect a broad perspective rather than a departmental or restricted attitude.

There might be some advantage at this point, now that the reasons for gages and gaging have been agreed upon—and the qualifications stipulated for the individual responsible at least for the original "gaging up" of a job, to discuss in detail various types of gages available and compare their merits. But such an arrangement conflicts with the purpose of this article and this line of thought will terminate, therefore, with the observation that the variety of gages now available presents a list which is conspicuous by its length at least, and the gage user—though in an occasional quandary because of difficulty to select—is in an enviable position because there is a suitable gage for practically every purse and purpose.

Selecting the Right Gage

A complete discussion of gages should also include detailed consideration of such matters as methods of selecting and ordering gages, their tactical distribution and location in plants, system of maintenance, etc. Closely allied, also, are the subjects of gaging temperature and measuring pressures. Inspection personnel and the correlating of Engineering, Inspection and Manufacturing are phases of a gaging program which must be considered and properly handled if efficient and harmonious operation is to be obtained.

The changing and more exacting requirements of industry have not been adequately met by "dressing up" the standard or conventional gage. Functional requirements for increased efficiency, quietness and dependability—and the eternal problem of producing at a lower cost—have demanded new gages; new in appearance, new in design, and new in method and place of operation.

Let us return briefly to the modified and accepted definition of a gage—"a device to improve quality, facilitate manufacture, and reduce cost of production." If it is to improve the accuracy or quality of the product, the gage must be infinitely accurate itself; it must analyze the dimension it gages and inform the operator or inspector of the location, nature, and degree of error.

If it is to facilitate manufacture, it must be fast in operation—tell the operator quickly and accurately "just how the job is running;" it must keep the machine operating continuously—at maximum efficiency.

If it is to reduce the cost of production—the gage must prevent incorrect parts from being produced; the gage must stand up under abuse as well as use; it must speed up inspection.

These briefly itemized "musts" suggest gages of the so-called "working" type, i.e., gages to be used at the machine by the machine operator himself, or by someone closely synchronized with his every movement.

There is no attempt to minimize the importance or need of inspection departments and subsequent gaging—but it is now an accepted fact that the principle point of gage application is directly at the point of manufacture. This arrangement establishes responsibility with the operator—ideal from the standpoints of operator and management

alike. In the correct exercise of their function, gages become "control" stations. The accompanying illustration (Fig. 1) of a Pratt & Whitney "Continuous" type Electrolimit Gage—broadly used in cold strip steel rolling—is symbolic of this function. And in Fig. 2 the strategically located "Internal" type Electrolimit Gage "controls" the production of a battery of diamond boring machines on a connecting rod job.

In this article a discussion of various types of gages and their comparative merits has been purposely avoided. That is a long story in itself. Our object has been to define the true function of gages, and to suggest briefly how and where they should be utilized to fully serve their intended purpose. Tremendous sums are squandered because of penny wise and pound foolish practice in gages. Conversely, intelligent and serious thought of this essential problem often has paved the way for improvement in product and a favorable adjustment of competitive position, both from product performance and price standpoints.

With the selection of gages and gage counsel now available to industry, and a proper cooperative spirit between gage user and gage manufacturer, rapid strides can be made in compelling gages to do their share in helping the manufacturer solve his problem of advancing the quality of his product and reducing the cost of manufacture.

FIGURE 2.

This strategically located Internal Gage "controls" the production of a battery of diamond boring machines on a connecting rod job. There is small chance of spoilage with such equipment at the operator's "elbow"; the boring machine battery can be operated at capacity production with full confidence that everything is O.K.



ACCURATE STATIC AND DYNAMIC BALANCE IS IMPORTANT

BY T. Y. OLSEN

President
Tinius Olsen Testing Machine Co.

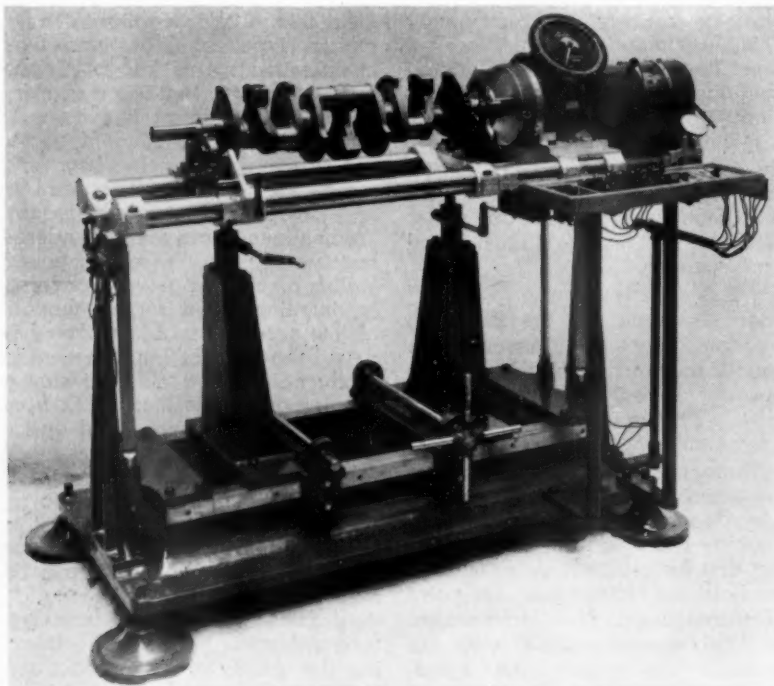


Figure 1. Latest type static-dynamic balancing machine for heavier parts.

IT IS OBVIOUS to everyone that the trend today is toward speed and still greater speed, not alone in one branch of industry or transportation, but so widely distributed in practically all fields, that there are very few of us who are not affected in one way or another by this tendency toward greater speed.

Probably to the majority of individuals thus affected, increased speed is simply an accepted fact, without a comprehensive understanding of what is behind its achievement, but to those responsible for its attainment, it means a higher degree of precision in manufacture, together with a more accurate static and dynamic balance of rotating parts, in fact it has become necessary to balance many parts heretofore entirely neglected. Thus it is becoming more and more evident that accurate and dependable balancing equipment is an extremely important factor in the

quest for greater speed without sacrifice of physical comfort or economy of operation.

Smoothness and quietness of operation of all machinery depends to a large degree upon balance. Excessive unbalance causes noise, wear on bearings, increased oil consumption, power losses, and depreciation due to the detrimental effects of vibration in loosening joints and weakening structural members. The degree to which these evils become noticeable, increases with increase in speed.

The amount of unbalance which may be detrimental depends upon many factors. In some parts unbalance may be very harmful or undesirable at even a few hundred revolutions per minute, especially if the part is structurally weak and is not adequately supported.

The fact that a complete machine bolted to a solid foundation does not seriously vibrate is not neces-

sarily evidence that the rotating parts are balanced; nor does it prove the presence or absence of damage being done by unbalance in the rotating parts. Heavy foundation and massive construction of machine may absorb vibration and remove the symptoms of unbalance but all the harmful effects of unbalance may still exist.

For example, an electric motor whose armature is unbalanced may run without evidence of unbalance at one speed with the motor located on one particular foundation. At other speeds, or if the motor is moved to another foundation, vibration may appear. This is due to the fact that all structures have a natural period of vibration. In this case the motor casing would have its own natural period, and the foundation would have another natural period. The unbalanced armature when rotating sets up a cycle of vibration for each revolution. If the natural periods of vibration of motor casing and foundation happen to be the same as the speed of rotation of armature, this is a synchronous speed at which maximum vibration will occur. If the natural periods of vibration of motor casing and foundation are not the same as the speed of rotation, these vibration periods may oppose each other at some particular speed or speeds of rotation. Outward evidence of vibration may then be practically eliminated, but within the machine the detrimental effects of vibration still exist.

From the foregoing it is evident that the procedure sometimes used of simply noting whether a finished machine appears to vibrate, is not in itself a reliable indication as to whether or not unbalance is present. The only sure way to know whether unbalance exists is to check the rotor separately on a suitable balancing machine and thereby definitely locate and remove the source of vibration.

The selection of a balancing machine to use is most important. The annoyance and uncertainty experienced with "home-made" balancing machines is due to the many variable factors entering into their design, construction and operation. These may mislead the user. A

machine that is improperly made or operated may register perfect balance when the part is unbalanced; or it may register the location or amount of unbalance at totally incorrect position or value. Unless the operator is familiar with all the characteristics of the machine used, he may obtain an incorrect reading and find that it is difficult or impossible to locate the source of error.

The process of balancing may be either with body at rest or in motion, but the latter is the only means of determining all of the unbalance which may exist.

Static Balancing

Static Balancing is a term applied to the process of balancing with body at rest or very slowly rotating so that centrifugal force is not considered. Unbalance that may be located and measured by this process can be determined by using level ways or rollers or by rotating the body in a balancing machine arranged for the purpose. Correction may be made by adding or removing material at one point so that the part will indicate balance by this process. Static balancing determines the amount and angular plane in which unbalance is located, and correction is made irrespective of its location along the axis of rotation.

Balancing by the use of level ways or rollers to support the bearings of the part at rest was formerly universal practice. These have been found inadequate for close balancing. Due to the manner in which they operate they are not very sensitive. They consume an excessive amount of time and can only be used for static balance. They give an approximation of the angular position, but no indication of the amount or location of the unbalance in a direction parallel to axis.

Level ways or other static balancing processes may be misleading if used to balance a comparatively long part such as electric motor armature. The unbalance may be near one end, but the level ways will not indicate its position in a lengthwise direction. If correction is made by adding weight on the opposite side and at the other end of armature it will appear balanced on the level ways. A dynamic couple has been introduced, however, that may be far more detrimental than the original static unbalance.

The usefulness of static balancing process is, therefore, confined to parts relatively short or where

lengthwise position of static unbalance is known. In these cases when static correction is made, it can be properly located in a lengthwise direction so that if any dynamic unbalance couple is created it will be so small as to be negligible.

Dynamic Balancing

Dynamic Balancing is the process of rotating a body at suitable speed so that the centrifugal forces due to unbalanced distribution of weight may be located and measured. The amount and position of dynamic unbalance can only be determined by rotating the body in a dynamic balancing machine which indicates the disturbing centrifugal unbalanced force or force couple. A dynamic balancing machine will also indicate static unbalance, and when

Figure 1 shows one of the latest types of static-dynamic balancing machines, a compensating type machine, in which an artificial unbalance is set up in the machine in such a manner as to oppose the unbalance in the part being balanced, and from this known artificial unbalance which the operator sets up, he can determine the amount and angular location of unbalance in the piece and correct for it accordingly.

The part being balanced runs in supporting rollers mounted on a vibratory cradle, which carries at one end the driving motor and compensator for setting up the artificial unbalance. This compensator is connected to the spindle which drives the part being balanced, hence runs at the same speed, but

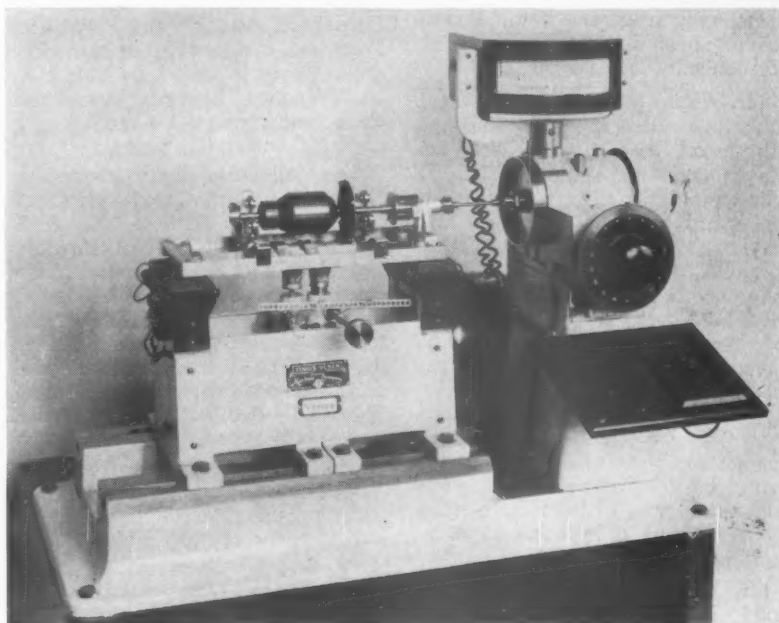


Figure 2. The "Vibro-Electric" self indicating type balancing machine for lighter weight parts.

only static unbalance exists correction can be made to balance the part by adding or removing weight at only one point. When dynamic unbalance exists correction cannot be made by adding or removing the material at one point, and can only be made by adding or removing material at two or more points to form a corrective couple.

When a rotating body is properly corrected for dynamic unbalance then it is also in static balance, but the converse is not always true, i.e., a body may be in perfect static balance and still be away out of balance dynamically, causing excessive noise, vibration and wear when running.

it is adjustable angularly with relation to the driven part, while the machine is running and the angular relation between the part being balanced and the compensator is indicated at all times by the high tension spark dial mounted on the vibratory cradle. This spark dial also indicates simultaneously the angular location of the unbalance in the part, so that it is an easy matter to adjust the angular position of the compensator until it is in line with the unbalance in the part, since the relative positions of both are shown on the spark dial at the same time. This angular adjustment of the compensator is accomplished electric-

(Continued on page 32)

TOLEDO IS SCENE OF SEMI-ANNUAL NATIONAL A.S.T.E. MEETING

Toledo was the Mecca of the Tool Engineers April 8th, representatives from North, East, West, South gathering there for the semi-annual National meeting. Detroit, especially, was well represented, arrangements having previously been made for a joint meeting. After a fine dinner attended by about 150 guests, Mr. Otto Winter, Toledo Chairman, turned the program over to Homer Brown, Entertainment Chairman. He in turn introduced Mr. Walter Seeman, who put on an excellent program, including dance numbers by Mr. Seeman's winsome little daughter and a boy whose name we didn't catch. Mr. McClellan of Detroit led some song numbers to the accompaniment of a charming lady accordionist.

Mr. Winter then opened the meeting with an address of welcome, and introduced Mr. Chas. Hoover, Vice-Mayor and Councilman of Toledo, who extended a sincere welcome to the members of A.S.T.E. Mr. Bob Haynes, Master Mechanic of Spicer Mfg. Co., gave a short talk on early manufacture for interchangeability, then introduced Mr. Ralph Carpenter, Vice President of Spicer, who gave a very interesting talk on gun manufacture in England and America, with comparisons of methods used. He also gave a verbal sketch of past and present methods of the manufacture of safety razor blades, with references in both subjects to the pioneering of interchangeability by Pratt & Whitney and Taft-Pierce.

Mr. Winter then introduced Mr. Ford Lamb, Past President of A.S.T.E. and recently appointed Executive-Secretary, who gave a resume of the history and objectives of the Society. In absence of C. Ray Brunner, Mr. Lamb read the Secretary's report, then called for reports from the following Committee Chairmen: W. H. Smila, Standards; Editorial, A. E. Rylander; Industrial Relations, Charles Staples; Publicity, U. S. James; New Chapters, Roy T. Bramson; and Constitution and By-Laws, R. M. Lippard. Mr. Bramson stated that at least six new chapters are slated for inclusion during '37, an encouraging report. Mr. Ford Lamb then expressed appreciation to past officers and committee men for their work during the past year, after which Mr. R. M. Lippard administered the oath of

office to the incoming National officers: President, Frank Shuler; First Vice President, Luke Beach; Second Vice President, Walter Wagner; Treasurer, Frank Crone, and, in absentee, C. Ray Brunner, Secretary.

Mr. Shuler, taking the gavel, introduced Ford R. Lamb as new Executive-Secretary and made the following appointments of Committee Chairmen: Membership, Wm. Fors; Editorial, A. E. Rylander with J. A. Markstrum Vice Chairman; Publicity, U. S. James; Standards, W. H. Smila; Historical, O. B. Jones; Constitution and By-Laws, R. M. Lippard; New Chapters, Roy T. Bramson, and Industrial Relations, T. B. Carpenter. Mr. Beach, First Vice President, outlined duties of various committees, followed by a talk by Mr. Wagner, Second Vice President, who predicted a membership of 10,000 within five years.

The following were elected to Nominating Committee to nominate men for Board of Directors: S. S. Randall, Detroit; Geo. Hawkey, Cleveland and Bob Haynes, Toledo, Nominating Committee at Large. Toledo, limited to two men on Nominating Committee, elected Homer Brown, N.Y.C.R.R., and Mr. Haynes of Spicer Manufacturing Company. Then followed installation of Detroit and Toledo Chapter officers.

Detroit, Chas. Staples, Chairman; Floyd Eaton, Secretary; G. Demorest, Treasurer.

Toledo, O. W. Winter, Chairman; A. R. Rennell, Secretary; N. Franklin, Treasurer.

A joint meeting of A.S.M.E. and A.S.T.E. to be held at Statler Hotel, Detroit, May 18th, 8 P.M., was announced. Mr. Lamb, after thanking Toledo Chapter for their fine hospitality, turned the meeting back to Toledo Chairman Otto Winter, who expressed appreciation to the Toledo men for their response to the formation of the Toledo Chapter. Mr. Staples, Detroit Chairman, then announced his committee appointments (see A.S.T.E. Chapter News—Detroit). After short talks by Floyd Eaton and G. Demorest of Detroit, Paul Zerkle and G. J. Hawkey, Chairman and Vice Chairman of Cleveland, the meeting adjourned. In all, it was indicative of the enthusiasm and spirit-of-progress characteristic of the American Society of Tool Engineers.

SETTLING AN OLD QUESTION

By

ROYAL A. HOLT

MEMBER A.S.T.E.

Former President, Gage Manufacturers' Association

WILL a one inch plug go in a one inch hole? Your writer for some time has been asking this question of men in all stations of the tool industry. The answer is sometimes an emphatic "yes" or "no" and sometimes noncommittal. Each has his own argument supporting his opinion. The most frequent reason for the "no" men is that there is a positive interference, claiming that there must be a clearance before any male member can enter a female. This idea is usually born in the mind of these men whose mental picture of the parts is a mechanical drawing. In order to draw, it is necessary to show lines that border these parts. Of course, they know that no such lines exist. But it is difficult to visualize it in any other manner.

The fellow that says "yes" to the question usually explains that it has been physically proven to him, or that he has had occasion to try it to prove his theory. And so opinions of the practical men have varied on this matter for years.

Up until recent years, either opinion could be right; but direct reading instruments have been introduced to enable us to measure the hole and the plug separately. After producing a plug as close to one inch as possible, and a ring to the same accuracy, it is found that after lubricating with vaseline the plug may be inserted in the ring and will pass freely with very little effort. We usually are not satisfied with a few passes, and continue to move the plug about and find that it is getting tighter. Suddenly it seizes, and you will probably have to press them apart.

Now, why this seizure? Probably the best explanation is to liken the operation to that of wringing two Johansson blocks together. If they are kept in motion with a slight pressure, in a few moments it will become very difficult to slide them. This condition is amplified many times in the plug and ring demonstration, because there is a much larger area; also all sides are kept in close contact. The condition of surface, of course, is a factor, the above illustration being one with a good lapped surface.

Now, what is the difference between a so called dry fit and a lubricated fit? Because results with our test of the lubricated gage show that seizure took place after the vaseline was wiped off, the writer contends that it is extremely difficult and dangerous to attempt to use the dry fit method making allowance for the difference.

Another test was made as follows. A quarter inch ring, one-half inch long was used with a plug gage having .0002 taper per inch. The plug was graduated every half inch in length which represented .0001 in diameter. When the plug was inserted dry, it definitely stopped at the same spot each time it was inserted. The parts were then covered with vaseline. It was found that the plug with no added effort would enter from one-half to three-quarters of an inch farther representing from .0001 to .00015 in diameter. Note that this variation was purely a lubrication test, the question

MASS PRODUCTION

By
C. G. Williams

CONSULTING MECHANICAL ENGINEER
Davenport, Iowa

A WAY back at the turn of some century, the Swedes or some Swede discovered America. History has said quite convincingly that Columbus discovered America. Now just why did the Swedes lose out? Just one reason, my dear Gaston, the Swedes did not advertise and the Spaniards did.

Thus it has been in industry. Some man leaps up and says, this did this, that does that, so the crowd unthinkingly cheers,—and the newspapers and radio.

Not long ago, in THE TOOL ENGINEER, some writer stated that "production, as we know it today, began shortly after the turn of the century." I would ask, what century?

For nearly two centuries, and perhaps more, men in this world have yelled and fought against "production" as we know it now. In England, weavers fought and killed men for inventing and installing and building power looms. Most of us can remember reading of those acts or similar ones, but how few of us have read that many years before that, strikes and fights were carried on because some one built a steam engine that could be used to pump water out of mines.

In England, today, we hear railings and bickerings over machine made guns in the United States. It was not until after the World War that the truly machine made gun entered England, the "mass production made gun," though it had been in this country since 1820.

But some one will say, if it was

Editors' (exchange of) Notes:

"Andy, you'll get a kick out of this. Perhaps you Swedes don't do enough advertising."

"What do you mean YOU SWEDES—this is one on the Norwegians. Anyway—it's good—let's run it. Williams knows his guns—if a bit weak on Viking history."

here, why did we not hear about it. The answer is that the gun companies did not advertise the fact that they had mass production for they were then as now catching hell from all the reformers and the crack-pots and politicians so they thought the best thing to do was to shut up and keep on making guns, only advertising the mass-production feature in the price asked for the gun.

"Mass Production as we know it now" entered the world definitely with the printing press and people in time forgot it. It again entered the world definitely with the weaving loom, even though it was at first hand operated. Mass production definitely entered the world again when the steam engine or water power operated loom was built and caused such "distress" in England. Mass Production entered this country definitely with the riots that were caused when the cotton gin was tried out in South Carolina. Mass Production as the world knew it entered the gun plants and there were bitter strikes and more bitter complaints and the reformers raved because some few men were thrown out of work.

Again we saw strikes and killings and more ravings when the first mowing machines were introduced on the farms. In Pennsylvania sev-

eral of them were broken up by men who wanted to bend their backs in the laborious task of cradling grain in the small fields of that day. The reaper and binder provided another opportunity for more crack-pots to start their moaning and wailing about men put out of work. The typewriter was hissed at by some men who wanted to write letters by hand.

The automobile was accepted by the world as a betterment until further ravings began in 1930 about the Technocrats destroying the world by making life easier for all even though it did at times put a few men out of work for a short time, and today we read—"Production entered the world shortly after the turn of the century," just because some men are radicals and have nit-wits for leaders. Daniel Webster, 80 years ago complained of the radicals as some of us today complain of the radicals in Washington, and yet the old world moves on with some dissatisfied men on one side doing all they can to improve conditions for all men while the politicians rail that the world will be ruined if this thing keeps up and if people do not accept "MY" remedy, my all powerful, all curing remedy for the ills of the world.

Some of us will see these reformers and crack-pots in their graves, while possibly others of us will be in our graves first, equally forgotten with the reformers, as the world sweeps on to better things and some one not yet born probably will say:—"Mass Production as we know it today, began about the end of the 20th century."

of adhesion was not present because the hole was straight and the plug tapered.

One inspector presented a case where the plug and hole checked with instruments showing a clearance of .0005. Still when the plug was checked for shape or side movement it measured only about .0003. How can we account for this? Merely because it was practically impossible for him to clean the side of the hole and plug, and get a perfect contact in just the same manner as if two size blocks were set one upon the other with no movement made to make the surface adhere.

Prove this to yourself. Make up a combination of size blocks by placing one

block on top of the other without side movement and check under a good comparator. Now take the same blocks, wring them together, and test again.

These facts and tests prove one very important thing—"When a measurement is taken where a lapped surface is concerned, it is necessary that they be rubbed until they adhere." Avoid flat lapped surfaces on fixtures. When possible, corrugate the surfaces and lap the tops of the corrugations.

Did you know that two more branch chapters of the A.S.T.E. are now being formed? See pages 46 and 48 of this issue, for details.

Next Month

You will want to be sure to save the June issue of "The Tool Engineer". It will deal with production problems of drilling, reaming and tapping. Some of the best talent in the country have contributed to make this a "bang-up" issue. Look for it—out June 3rd.



WALTER F. WAGNER
Second Vice President



LUKE E. BEACH
First Vice President



C. RAY BRUNNER
Secretary



FRANK A. SHULER
PRESIDENT

Mr. Shuler, who has served the Society the past year as First Vice President, is well known to hundreds of manufacturing executives and Tool Engineers in various sections of the country. His rise to eminence in the field of mass production has been along the route of practical experience—beginning at the bottom. In 1907 he was first associated with the Timken-Axle Company in Canton, Ohio. Later he was transferred to the Detroit branch of the company in the capacity of Master Mechanic. At present he is Master Mechanic of the Highland Park Plant of the Chrysler Motor Corporation in Detroit. His work in developing methods of rear axle housing fabrication is well known.

"Frank" is a man of few words, father of a good sized family, doesn't play golf and doesn't go out (much). He is a man of action and results.

We look forward to his administration as one in which the Society will grow to greater usefulness and interest to the practical production executive who seeks practical technical information and the pleasure of mixing with his fellows in the common purpose of furthering the profession of which he is a part.

LUKE E. BEACH
FIRST VICE PRESIDENT

Mr. Beach, by the recent election, is elevated from the position of Second Vice President to First Vice President of the Society. Many important committees of the Society will report directly to him.

Mr. Beach is another Tool Engineer who has risen from the ranks. Born in Birmingham, Michigan (suburb of Detroit) he received his early education there. During a four year apprenticeship course at the Burroughs Adding Machine Company, Detroit, he studied mathematics and designing. Then followed a number of years in tool making and about six years of tool designing during which period he studied factory management and time study. At this time he became Assistant Chief Tool Designer at the Cadillac Motor Car Company. Later he became Chief Tool Designer and Assistant Superintendent of tools at the Lincoln Motor Company. Returning again to Cadillac Motor Company as Tool Engineer, he was promoted to Assistant Superintendent of Tools and Equipment. For the past three years he has been connected with the Packard Motor Car Company, Main Division, as Processing Engineer and at the present time is Supervisor of Processing.

Mr. Beach is a highly qualified man to be included among the officers of the American Society of Tool Engineers, and his loyalty and sound counsel are attributes which make him a splendid man for the job he has been entrusted with.

WALTER F. WAGNER
SECOND VICE PRESIDENT

Mr. Wagner's qualifications for an important office in the American Society of Tool Engineers unmistakably speak for him. When asked about his personal history, Mr. Wagner replied as follows:

"Started in the shop of E. R. Thomas Motor Company of Buffalo, New York in 1906. Spent most of my time there as an apprentice in the Engineering Department. Started at the Piquette Avenue plant of Ford Motor Company in 1909 in the Tool Design Department, later went to Northway Motor Company for three and a half years. The next five years I gathered experience at the Cadillac Motor Company, Studebaker, Maxwell and Oakland Motor Company. Was Chief Tool Designer at Republic Motor Truck Company. Started with Henry Leland in 1917 with the organization of the Lincoln Motor Company. Went to Hudson Motor Company in 1920 as Chief Tool Designer. In 1922 returned to Lincoln Motor Company when it was acquired by the Ford Motor Company and have continued here since. My position now is Mechanical Superintendent."

Those who know Mr. Wagner intimately know him to be a man of comparatively few words but one whose counsel has been found very valuable and whose interest in the Society is genuine.

Here Are Who Will Pilot A. S. T. E.

On these pages we introduce to our readers, members and friends of the American Society of Tool Engineers, the recently elected National Officers and also Mr. Ford R. Lamb, the unanimous choice of the A.S.T.E. Board of Directors for the newly created office of Executive-Secretary. On a highly festive and significant occasion, at a joint meeting with the newly chartered chapter at Toledo, Ohio, on Thursday evening, April 8th, these men were duly installed into their offices. The meeting was attended by Mr. Hoover, former Vice Mayor of the City of Toledo and by Mr. Ralph Carpenter, Vice President in charge of Manufacturing of the Spicer Manufacturing Com-



FRANK A. SHULER
President

FRANK R. CRONE
Treasurer



the Men for Another Successful Year

pany of Toledo, who gave the main address of the evening. Other notables in the world of mass production and Tool Engineering also attended. Many of the high lights of this meeting, which was hailed as a milestone in the progress of the Society, are touched upon in other features of this issue. The address of Mr. Carpenter was highly interesting and indicated the progress the profession of Tool Engineering has made. The meeting was presided over by retiring President F. R. Lamb, and O. W. Winter, Chairman of Toledo Chapter A.S.T.E. It was held at the Waldorf Hotel in Toledo and was attended by many members and friends from Detroit and Cleveland Chapters.

FRANK R. CRONE
TREASURER

Mr. Crone was re-elected to the important office of National Treasurer, due, no doubt, to his unceasing work during the past year in keeping the accounts of the Society accurate and understandable to the membership. Although proficient in the duties of a finance officer, Frank is a Tool Engineer of very wide experience. Before the World War he was engaged as Tool Designer with such manufacturers as the Saxon Motor Company, Studebaker, Cadillac and Maxwell. During the war he was stationed in Paris in the service of the Air Force making the installation drawings for bombing devices and machine guns in various types of planes.

Since the close of the war, Mr. Crone has been in the Tool Designing Department of the Lincoln Motor Company where he is now Chief Tool Designer. He has always been an ardent booster for A.S.T.E. and has repeatedly expressed his confidence in the future possibilities of the organization.

"At this time," he says, "I would like to repeat my views of still greater possibilities for the A.S.T.E. which in the last year has shown such splendid progress—although I don't believe it represents more than a very small degree the growth we can expect in the future. It is still a baby—in its infancy."

C. RAY BRUNNER
SECRETARY

Mr. Brunner, re-elected Secretary of the Society was born in Georgetown, Ohio, and received his early education at Muncie, Indiana. During an itinerant apprenticeship in machine shops in various Indiana cities, Mr. Brunner studied mathematics and mechanical drawing. Later he came to Flint, Michigan, as Assistant Tool Room Foreman of the Chevrolet Motor Company. During the world war he was transferred to Tool Designing.

Coming to Detroit, Mr. Brunner was engaged in the Tool Designing Department of the Cadillac Motor Company and in a similar capacity at the Northway Motors, where he later served as Assistant Chief Tool Designer. For a period he served with the Dodge Ordnance Department as Production Foreman. For the past fifteen years he has been with the Dodge Main Division, of the Chrysler Corporation as a Tool Engineer.

Mr. Brunner has served the Society very faithfully during the past year in the office of Secretary which involves considerable time and effort. He has also been called upon to travel to a number of distant cities to assist in the chartering and installation of new branches of the Society. We don't wish you any hard luck, Mr. Brunner, but we hope you have many more "flying trips" to make in the establishment of new chapters in the year to come.



FORD R. LAMB
Newly Elected Executive-Secretary

FORD R. LAMB
EXECUTIVE SECRETARY

By unanimous election of the Board of Directors of the American Society of Tool Engineers held in Detroit, March 19th, 1937, Mr. Ford R. Lamb, Past President and charter member of the Society, was elected to the office of Executive-Secretary.

Mr. Lamb is most admirably suited for his new job. He is a practical man who has been engaged in the Tool Engineering profession for more than twenty years. He knows the practical aspects of Tool Designing, Production Engineering, Metal Processing, Methods and Tool Engineering in general. He has taught Tool Designing and Tool Engineering at different times. He is an inventor of mechanisms used in the Tool Engineering field—particularly devices for stud setting, in fact he is known as "the father of stud setting."

Ford plays a "rotten game of golf" by his own admission, but shoots a mean gun on pheasants and rabbits. He was born June 28th, 1891 in Ingham County, Michigan. His parents were farmers and Ford Lamb still has the farm heritage, living the life of a country gentleman in the big city (?) of Pinckney, Michigan, and states that he "likes to make things grow." All join in wishing Mr. Lamb every success in his new job and we all expect to see him make the A.S.T.E. "grow" to his heart's content.

PRODUCTION PERSPECTIVES

News of Mass Manufacturing from Everywhere

Despite "sit down" confusion in mass manufacturing industries, in different industrial centers of the country, the trend is toward higher levels of production. Indicative of this are the very sizable capital expenditures for new plants and new manufacturing facilities. The **Aluminum Company of America** will build a new plant at Lafayette, Indiana for instance, for the manufacture of extruded shapes and tubing involving an expenditure running into many millions. **General Motors Corporation** will spend \$1,500,000 for a new Diesel Engine unit to be erected in Detroit. Of this amount about one-half million dollars will be spent for factory buildings, while about one million dollars will be spent for new equipment. One of the largest factory expansions in New England's history is that of the **Bridgeport Brass Company**, Bridgeport, Connecticut, which has approved plans for new constructions and equipment to cost \$4,000,000. High-lights of mass manufacturing activities in various sections of the country are as follows:

Mid-West

From **Milwaukee**, we hear that the old Hercules plant of the **Harnischfeger Corporation** on Robinson Avenue, idle since 1930, will be re-opened as soon as repairs can be made. The company will move its growing Electric Welding Rod Division to the plant from its West Milwaukee factories.

From **Cleveland** we hear that the **Cleveland Automatic Machine Company** held their annual meeting April 10th—concluding a successful year. **Walter E. Brown**, former postmaster general and president of the company presided at the meeting. The company is working night and day and is reported to be about five months behind on orders. **J. C. Walterworth**, production manager, was elected to the Board of Directors. The National Machine Tool Builders' Association reported that a renewed influx of domestic orders was sufficient to more than offset a slight decline in foreign machine tool business and to shoot the index of orders of the National Machine Tool Builders' Association to the highest point for the year.

Alliance, Ohio, plants on April

10th issued the largest pay roll since 1929. **Transue-Williams'** pay roll was the largest in eight years, the **Machined Steel Casting Co.** pay roll was the largest since 1930. From **Dayton** we hear that **Airtemp, Inc.**, has appointed **Charles R. Neeson**, Chief Engineer. **R. G. Wyld** has been named Executive Engineer. **Leland Electric Company**, Dayton, has appointed **W. B. Minch** Factory Manager. He will supervise the production of all Leland



CARL B. AUDEL

Westinghouse Executive who died April 4th.

products. Mr. Minch was formerly with the Cleveland Welding Co.

From Cincinnati we hear that **M. A. Beckman**, factory manager and chief engineer of **Aluminum Industries, Inc.** has been named Vice-President of the company.

E. A. Herrcke, formerly assistant Sales Manager of the **National Automatic Tool Company** in Richmond, Indiana has been made **Chicago District Manager** for the company. He is succeeded by **Charles T. Peters** as assistant Sales Manager while **A.S.T.E.'er Bert Carpenter** is transferred to the Detroit branch of the company. **Robert Galloway**, Sales Engineer of the National Automatic Tool Company, is now located in Richmond. The **Whiting Corp.**, at Harvey, Illinois, has expanded its stoker division and appointed **Dr. W. A. Pearl** to take full charge of production and engineering. **Hannifin Mfg. Co.**, Chicago, has purchased the machinery, equipment and name of **John F. Allen Co.**, of New York, makers of air operated riveting machines. Manufacture, sales and service of Allen riveting machines will be continued

as the **Allen Riveter Works**, Division of **Hannifin Mfg. Co.**, at St. Marys, Ohio. The **Hannifin Mfg. Co.** has recently completed a new plant at St. Marys, Ohio, equipped for the production of large machinery. From **East Pittsburgh** comes news of the death of **Carl B. Auel**, aged 67, for many years manager of the Employees' Service of the **Westinghouse Electric & Mfg. Co.** and a nationally known leader of industrial relations and industrial safety activities. Mr. Auel died at his home at Irwin, Sunday night, April 4th, after a brief illness. He had joined the Westinghouse Co. in 1893 and after serving an apprentice course became a member of the Works Department. He was soon in charge of production, later became manager of the railway and control departments, then assistant manager of works and directed standardization processes of company activities. He was a past President of the National Safety Council and had been presented the Westinghouse Order of Merit, awarded to those whose work is outstanding.

The manufacture of machinery for the **World's Largest Single Installation of Refrigeration for Air Conditioning** has been started in the shops of the **York Ice Machinery Corporation**, York, Penna. A power plant building is under construction in Washington which will house the refrigerating and water-cooling equipment for air conditioning the Capitol, the Senate Office Building, and the old and new House Office Buildings. The first large installation of a central water-cooling plant for air conditioning of separate buildings, this system is a realization of the most advanced principles in modern practice and may set the standards for many of the developments in the future.

East

A community apprenticeship training program to educate employees in skilled trades, their time during the training period being paid for by their respective firms, will be established under supervision of a joint committee of the **Bridgeport Manufacturers' Association** and the **State Trade School** to meet a shortage of machinists, tool-

(Continued on page 50)

MAY CHAPTER MEETINGS

Chapter Meeting Announcements must be received on or before the 20th of preceding month.
Omissions are the result of not receiving this information by this date—in time for publication.

BRIDGEPORT

May 13th, 1937—Hotel Barnum, 140 Fairfield Avenue, Second Floor—to right of main stairs.
Meeting 8:00 P. M.

Speaker: A. Snyder, Morse Twist Drill Company.

Subject: "Manufacturing—Use of Drills, Their Origin and Development Up to the Present Time."

CHICAGO

May 10, 1937—Dinner: 6:30 P. M.—\$1.00 per plate. Technical Session: 8:00 P. M., Machinery Club, 571 W. Washington Blvd.

Speaker: Mr. L. A. Trofimov, M.S. Research and Development Engineer and President of Trofimov School of Inventive Practice, Cleveland Heights, Ohio.

Subject: Inventiveness.

Are you satisfied with "your" way of working out your technical problems? Would you like to see how others tackle theirs? Is it possible to train your mind to stay on the time-saving track and arrive with the answer on schedule? Are you a THINKER or a TINKER? Are you a boss and can you bank on Bill and can Bill bank on you?

Mr. Trofimov comes highly recommended as a THINKER and you can bank on it Tool Engineers need and have ideas but let's screen out the chaff and get down to the meat. Bring along all whom you know will be interested in this timely subject.

Make reservations with Chapter Secretary W. T. Wilson, 7428 Euclid Avenue or Phone Midway 9853.

CLEVELAND

May 18, 1937—Dinner: 6:30 P. M.—\$1.00 per plate. Technical Session at 8:00 P. M., The Colonial Hotel, 523 Prospect Avenue.

Speaker and Subject will be announced later by postal card. Make your reservations as early as possible with your new Secretary, Mr. C. V. Briner, 1433 East 12th Street, Telephone Cherry 8034.

DETROIT

JOINT MEETING WITH AMERICAN SOCIETY OF MECHANICAL ENGINEERS

May 18th, 1937—Statler Hotel Ballroom Floor, 8:00 P. M. Subject: "Improved Methods of Fabrication."

Chairman: Mr. James H. Herron, Pres. A.S.M.E.

Vice Chairman: Mr. William I. Batt, Past Pres. A.S.M.E.

Recorder: Mr. Eric Oberg.

All members of the A.S.T.E. are cordially invited to attend this important session of the A.S.M.E. Semi-Annual Meeting. Admission upon presentation of A.S.T.E. membership cards.

MILWAUKEE

Regular monthly meeting of the American Society of Tool Engineers to be held at Republican House, Colonial Room on May 13, 1937.

Speaker: Mr. Harold Heywood, Chief Inspector, Kearney & Trecker, Milwaukee, Wis.

Subject: "Production Methods versus Work Incentives as Applied in the Machine Tool Industry."

Dinner 6:30 P.M.—\$1.00 per plate. Make reservations early.

PITTSBURGH

May 14, 1937—Dinner: 6:30 P. M.—\$1.50 per plate. Meeting: 8:00 P. M., Norse Room, Fort Pitt Hotel.

Speaker: Mr. W. W. Broughton, New Jersey Zinc Company.

Subject: "Die Castings When and How."

Reservations: Please make dinner reservations before noon, Friday, May 14th. Call Miss Davenport, Valley 511 or Brandywine 1490.

RACINE

JOINT DINNER MEETING WITH THE RACINE JUNIOR ENGINEERS

May 17, 1937—Dinner: 6:30 P. M., Racine Vocational School, 800 Center Street.

Speakers: Mr. Harry Shedgewick, General Superintendent, Cutler-Hammer, Inc., Milwaukee, Wisconsin. Mr. Arthur Johnson, Chief Tool Engineer, Cutler-Hammer, Inc., Milwaukee, Wisconsin.

Subject: Mr. Shedgewick will give a general talk on "Die Design" and Mr. Johnson will talk on "Die Engineering in General."

During the course of the evening a tour will be made through the Racine Vocational School.

Questions from the floor, during the talk and after, will be answered by the speakers.

Make reservations early by calling Jackson 6460 or by writing to Mr. Henry H. Springhorn, Secretary of Racine Chapter, 1615 N. St. Clair Street, Racine, Wisconsin.

TOLEDO

May 19th, 1937

Speaker: E. Q. Beckwith, The Phillips Petroleum Co.

NOTE: Call Mr. L. E. Rennell, Phone Jefferson 2538W for reservations, time, meeting place, etc. Members will be advised of exact time, meeting place and other details by mail.

A. S. T. E. CHAPTER NEWS

BUFFALO

Benjamin C. Buerk, Secretary
315 Grote Street, Buffalo, N.Y.

On March 29, 1937 a dinner and meeting was held at the Buffalo Athletic Club at 7:00 P.M. for the purpose of organizing a Buffalo Chapter of the American Society of Tool Engineers.

Mr. J. Don Reep, who called this group of approximately forty men together announced that the R. C. Neal Company was the host for the evening. After the dinner Mr. Reep introduced Mr. Ford R. Lamb and Mr. C. R. Brunner, President and Secretary respectively of the National Society.

Mr. Lamb then gave a very interesting talk in which he traced the history of Tool Engineering, its origin, its development and the present need for this Society. He outlined the organization of the American Society of Tool Engineers, its requirements, its cost, its financial management and its administration and operation. He explained the benefits to its members mentioning the monthly magazine "The Tool Engineer," its standards sheets and its meetings wherein the members can disseminate technical information, make acquaintances and contacts and promote their own general development and advancement. Mr. Lamb next explained the operation of the local chapters.

A sufficient number of applications for membership were taken and were given to Mr. Brunner, the National Secretary.

An election of officers by secret ballot was held, nominations coming from the floor, at which the following officers were elected: Mr. Don Reep, President; Mr. Wm. Weinrich, Treasurer; Mr. Ben Buerk, Secretary.

Mr. Lamb then presented Mr. Reep the charter for the Buffalo Chapter and the Secretary and Treasurer with their books and documents.

A short discussion was held regarding the time and place for future meetings. By a show of hands, it was decided to hold future meetings on the second Friday of every month with the exception of July and August, and possibly June.

The President appointed Mr. Whistler, Chairman of the Membership Committee and Mr. Brunn, Chairman of the Meetings Commit-

tee, subject to the latter's acceptance.

A rising vote of thanks was given to Mr. Lamb and Mr. Brunner for their coming to Buffalo and to Mr. Ray Neal for his generous sponsorship of this meeting.

▼ ▼ ▼

The first regular meeting of the Buffalo Chapter of the American Society of Tool Engineers was held in the Iroquois Room of the Hotel Statler on April 9, 1937. Meeting was called to order at 8:30. Mr. J. Don Reep, presiding.

The Chairman explained that the purpose of the meeting was to make plans for our future meetings, organize a membership drive and to start the committees functioning. He announced that arrangements had been made with Mr. F. S. Blackall of the Taft-Pierce Company to speak to us on "Gage Manufacturing and Gage Design" at our next meeting on May 14th, which will probably be a dinner meeting.

The Chairman asked Mr. Brunn and Mr. Whistler to appoint members to their committees. The Chairman asked for volunteers to serve on the Membership Committee and the suggestion was made that everyone bring at least one new member to the next meeting, everyone was supplied with two application blanks.

Mr. Leary asked for a further clarification on requirements for membership. Mr. Brunn, Chairman of the Meetings Committee, asked for an opinion on the nature and place for the next meeting. By a show of hands, those present favored a dinner meeting at the Buffalo Consistory. Mr. Rossman suggested that the time of the speaker be mentioned in the notice for those who

do not come to the dinner. A discussion followed regarding the desirability of having a June meeting, but action was deferred until next meeting. Mr. Rossman offered to give a talk on "Spring Design" at some future meeting.

DETROIT

R. M. Smith, Chapter Publicity Chairman
12775 Greenlawn, Detroit, Mich.

The following officers have been elected or appointed to serve Detroit for the coming year. They re-

DETROIT CHAPTER MEETING NOTICE

All elected and appointed officers and committeemen are requested to attend an executive meeting on the third Thursday of each month at the offices of The Society—5928 Second Boulevard, Detroit. The purpose of this meeting, each month, will be to co-ordinate the activities of committees, and plan such new business as may come up from time to time. These meetings will start at 7:30 p.m. and end promptly at 9:00 p.m.—C.F. Staples, Chairman.

All members are invited to attend these meetings.

quest the hearty co-operation of the membership in fulfilling the duties of their new offices.

C. F. Staples, Chairman—Giern & Anholtt Tool Co., Detroit

F. W. Eaton, Secretary—Burrhoughs Adding Machine Company, Detroit

George Demorest, Treasurer—Packard Motor Car Company, Detroit

Committee Chairmen

Meetings—Dave Forsman, Sterling—French Machinery Company, Detroit

Publicity—R. M. Smith, Detroit Gear & Machine Company, Detroit

Nominating—Ed. Rummins—R & M Manufacturing Company, Detroit

Industrial Relations—K. S. Kuhn, McCrosky Tool Company, Detroit

Reception—C. Thiede—Chrysler Corporation—Jefferson Plant, Detroit

Entertainment—Wm. McClellan, Gairing Tool Company, Detroit

Detroit has had its ups and downs the past couple of months. The sit-down at Chrysler's put a hiatus to the dinner meeting at Chrysler Institute of Engineering, then, last minute alternatives arranged by the officers were cancelled because of mixed dates. Then, a friend in need being a friend indeed, the Ameri-

(Continued on page 22)

CLEVELAND

R. P. Oswell, Chapter Publicity Chairman
1595 Hawthorne Road, Cleveland

SPECIAL NOTICE

CLEVELAND CHAPTER SECOND
ANNUAL

TANGO SUPPER

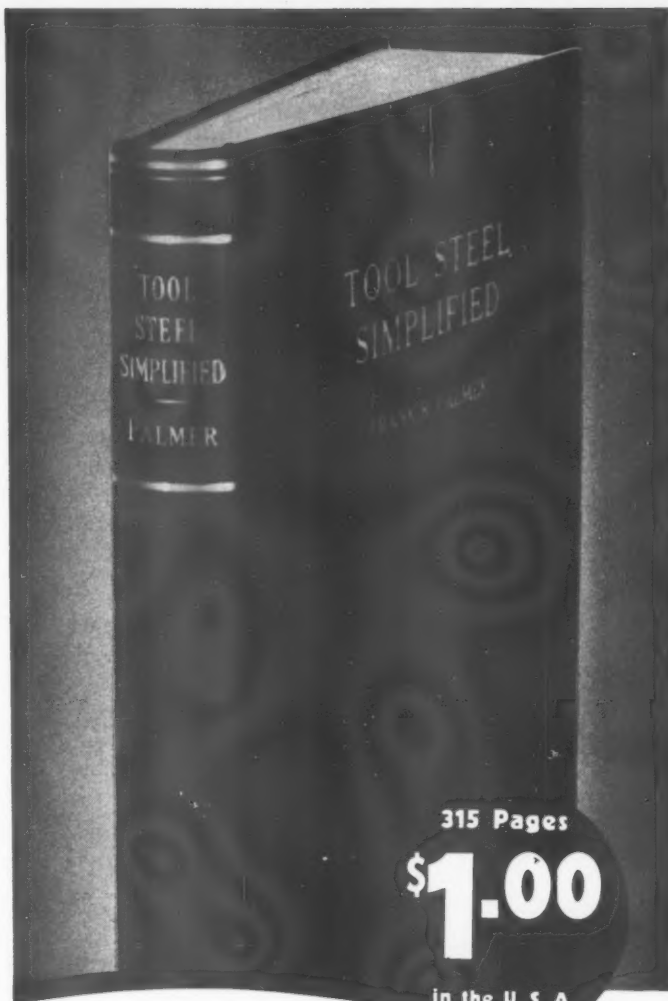
May 22nd, 1937

Time: 6:30 P.M.

Place: Penton Building

West 3rd Street and Lakeside Avenue

There will be plenty to eat and drink, music, Bingo and prizes. Last year's party was very successful. Members and friends are cordially invited to attend.



315 Pages

\$1.00

in the U. S. A.
postpaid

Get this NEW Handbook NOW!

READ THESE COMMENTS:

"It is simple and easy to read and contains interesting and useful information which I am sure will commend it to technical men, semi-technical men and men in the shops who want to improve their ability to make the best use of tools and tool steel."

PROF. BRADLEY STOUGHTON
Department of Metallurgical Engr.
Lehigh University

"... a valuable text book for apprentices and journeymen, and an equally valuable handbook for designers and others concerned with the use of tool steel."

J. B. CHALMERS
Director of Training School
The Yale & Towne Mfg. Co.

"... Part Two offers a workable method by which anyone can make changes in the type of tool steel he is using with some understanding of the theory in back of his efforts."

CARL G. JOHNSON
Worcester Polytechnic Institute
Worcester, Mass.

"Here is a volume which the author calls a handbook but which is very much more. There is no question but that every tool maker and four out of five metallurgists, will know more about tool steels and their treatment after reading it."

from a review by
K. H. CONDIT
Editor, American Machinist

"... a really worthwhile book for industrial men. . . . The chapter on 'trouble shooting' is of tremendous practical value. It gives the tool maker short cuts for locating trouble."

EDWARD H. BOHN
Instructor in Related Science
Camden County Vocational School
Merchantville, N. J.

Just Off the Press

How to Select and Heat Treat the Proper Steel to Make Any Kind of Tool

Here at last is a book for the man who makes tools—a plain, practical, common sense explanation of how to make tools that last longer. It will help you show your company how to get bigger production and how to bring down tool costs.

TOOL STEEL SIMPLIFIED

By FRANK R. PALMER

Assistant to the President
The Carpenter Steel Company

315 Pages, 6x9. 205 Illustrations, \$1.00

This is the first book to give the tool maker simplified methods for the selection and heat treatment of tool steel.

It is a handbook of modern practice for the men who are responsible for your tools. You will want it:

- to check up on your methods
- to get quicker answers to tool problems
- to save time and effort
- to simplify your work

Just a few of the problems this book will answer for you:

HOW to stop tools from warping—How to avoid grinding checks—How to make tools wear longer—What furnace atmosphere shall I use?—How to make the spark test—What is a Monotron Hardness Tester?—Shall I quench in fresh water or brine?—How does tool design affect cracking?—What is the Shepherd P-F Test?—How to make tools that won't break—How to prevent size change—How to be a trouble shooter.

For the Man Who Wants to Get Bigger Production and Lower Costs

THE CARPENTER STEEL CO.

Dept. A-4 READING, PENNA.

Please send me postpaid the convenient new 315 page handbook—"Tool Steel Simplified". I am inclosing \$1.00. (Price \$3.50 outside U. S. A.)

Signature _____

Address _____

City and State _____

Firm or Employer _____

Occupation _____

A.S.T.E. Chapter News

(Continued from page 20)

can Welding Society extended an invitation for a joint meeting at Statler Hotel the evening of March 26th. For that courtesy, which permitted the election of new officers without holding a special meeting, Detroit Chapter expresses grateful appreciation to our friends of the A.W.S.

The meeting, opened by Mr. Don Corey of Detroit Edison, was then turned over to Mr. R. R. Bozell of Whitehead & Kales Company, who introduced the speakers. Mr. T. C. Fockler, of Westinghouse-Electric & Manufacturing Company, gave a very interesting talk on welding developments by his company, especially in the construction of frames and the huge "horseshoe" of the 200" telescope now intriguing the interest of the world. The lecture was profusely illustrated with slides. Mr. Tom Johnston of the Whitehead & Kales also gave a comprehensive outline of the welding of machine bases and tools; in all, a meeting of more than ordinary interest to the Tool Engineers.

After the technical session of the A.W.S., Detroit Chapter elected its officers to serve for 1937-38 as given above. That done, a spell of good fellowship with our hosts, the Welding Engineers—and royal hosts they were—and meeting adjourned after arrangements had been made for joint meeting with Toledo Chapter April 8th.

In line with closer co-ordination between various engineering societies, The American Society of Mechanical Engineers has invited Detroit Chapter to a joint meeting at Hotel Statler the evening of May 18th, this taking the place of the regular May meeting of Detroit Tool Engineers. See announcement under meetings.

MILWAUKEE

E. E. Houston, Chapter Publicity Chairman
1029 So. 35th St., Milwaukee, Wis.

Milwaukee Chapter was addressed at the Republican House on April 8th by Mr. S. M. Ransome, Chief Tool Engineer, Barber-Colman Co., Rockford, Ill. His subject was "Hobs" and he discussed hobs and gear cutting methods in a very technical manner, using slides to illustrate the various types of fixtures used in hobbing operations.

Another highlight of the meeting was a paper presented in a black-board discussion by Mr. Harry Sedgwick, a member. This paper set forth the physical, educational and

social requirements of a "Manufacturing Engineer," and he also presented a plan whereby a young man in the tool engineering profession could realize a goal. His talk stressed the physiological makeup which is necessary to justify a position in this field. Mr. Sedgwick ended his discourse with a general discussion among the group of a special work spindle used for heavy duty grinding.

The Chapter has enjoyed some very interesting papers brought to us by our members in the past months. The information in these papers can be put to practical use in our professional work.

A dance committee was elected to make arrangements for our first dance to be held at the Eagles on April 29th. Members of the committee are Irvin Schober, A. E. Rutzen and E. E. Houston.

PITTSBURGH

J. H. Thomas, Chapter Publicity Chairman
7442 Pennfield Court, Pittsburgh

Meeting of April 9, 1937.

Registered Attendance, fifty three.

Meeting called to order by Chairman J. R. Weaver at 8:00 P.M.

Mr. Weaver expressed the wish of the officers to receive suggestions on a meeting place, dinner and sponsors. It seemed to be the general impression that arrangements for this meeting were satisfactory and that further plans be left to the discretion of the committees and officers.

Mr. Elbert, Chairman of the Entertainment Committee, unveiled, introduced and demonstrated a very amusing piece of equipment which he called "Marvelous Manufacturing Machine."

Mr. Curtis, Chairman of the Program Committee, introduced the speaker, Mr. A. E. Turner, Engineer, R. G. Haskins Company, Chicago, Illinois. Mr. Turner presented a very interesting analysis of tapping problems and contributed many practical ideas and suggestions. Copies of his paper are to be sent to the Chapter for distribution.

Following are some of those who entered into the interesting discussion which followed: Fred Herr, W. E. & Mfg. Co.; Charles L. Klein, W. E. & Mfg. Co.; K. P. Rolston, Screw Mach. Spec. Co.; J. W. Carthew, West. Air Brake Co.; D. A. Shaw, Flannery Bolt Company; G. P. Grace, Robertshaw Thermostat Co.; F. S. Brooks, Pitts. Equitable Meter Co.; Malcolm F. Judkins, Firth-Sterling Steel Co.; E. D. Ganquere, W. E. & Mfg. Co.; Raymond

R. Artz, Vanadium-Alloy Steel Co.; G. L. Kronfeld, Delaware Tool Steel Corp.

Mr. Weaver read the personnel of all committees and suggested that they get together.

TOLEDO

Walter Ulrich, Chapter Publicity Chairman
2335 Cherry Street, Toledo, Ohio

Toledo Chapter of the American Society of Tool Engineers played host to the Semi Annual Meeting of the National Chapter and the Detroit Chapter on April 8th, 1937, which was very well attended by the members and their friends. Dinner was served at 6:30 P.M. in the dining room of the Waldorf Hotel which was followed by a well arranged program of entertainment.

The meeting was called to order by Chairman Otto Winters, who, after his chastizing remarks in regard to the Detroit branch considering Toledo its suburb, introduced Past Vice-Mayor and Present Councilman, Charles Hoover, pattern shop foreman for the Electric Auto Lite Co. Mr. Hoover welcomed visitors from out of town and expressed pleasure over the advent of a new chapter for Toledo.

Mr. Winters then introduced Mr. Robert B. Haynes, who spoke on the difficulties of the early days in making interchangeable parts for firearms which was the forerunner of the present mass production method. Mr. Haynes also referred to his early acquaintance with Mr. Ralph E. Carpenter, Vice-President and General Manager of the Spicer Mfg. Corp., whom he introduced as the next speaker.

Mr. Carpenter has a tool engineering background that places him in sympathy with our aims and ambitions. He gave a very interesting talk of his experiences in the days with The Taft-Pierce Mfg. Co.; his trip to England in the interests of interchangeable tooling for Enfield rifles. His many experiences and known ability as a speaker made it very interesting for everyone.

The meeting was then turned over to the National Officers who installed their incoming officers as described elsewhere in this issue.

RACINE

T. J. Santry, Chapter Publicity Chairman.
1615 Racine Street, Racine

The regular monthly dinner meeting of the Racine Chapter, American Society of Tool Engineers was held Monday, April 12th, at 6:30 P.M., at Hotel Racine.

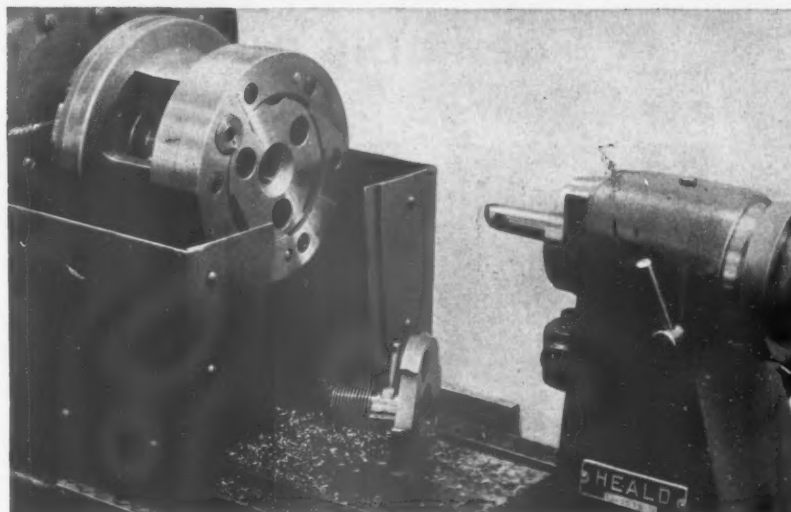
(Continued on page 30)

Cylinders

PRECISION FINISHED on Heald BORE-MATICS

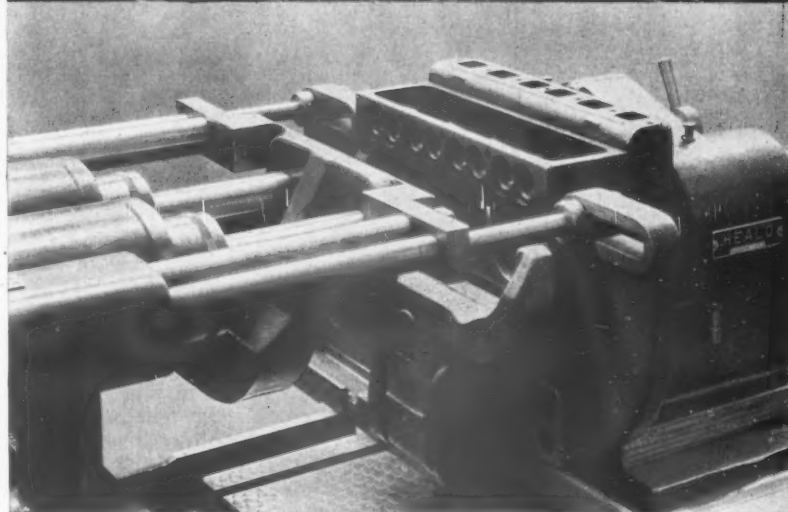
$\frac{7}{8}$ INCHES

Every type and size of cylinder can be precision finished on a Heald Bore-Matic. This ranges from the opposite tiny miniature engine cylinder (see cylinder attached to loading plate on table) with only $\frac{7}{8}$ " bore, 1" stroke, ideally handled on our No. 48 Bore-Matic, to a straight-8 automobile or large diesel engine cylinder.



$2\frac{1}{4}$ INCHES

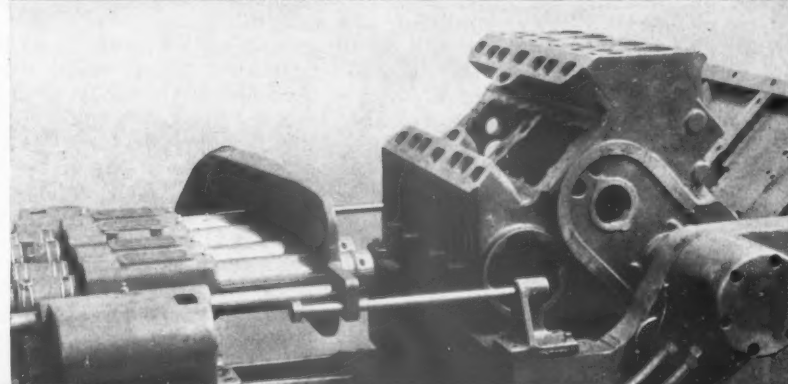
European manufacturers of small cars find the Heald No. 48 Bore-Matic ideal for precision finishing the cylinder blocks. Opposite, this machine is finishing two bores at a time with hydraulic indexing between each set of holes $2\frac{1}{4}$ " diameter spaced $2\frac{5}{8}$ " apart. Large size blocks, however, are better handled on larger Bore-Matics such as shown below.



$3\frac{1}{2}$ INCHES

Here a No. 45 Bore-Matic is precision finishing a V8 automobile cylinder block. One side is precision bored, the block reversed and the other set of holes precision finished.

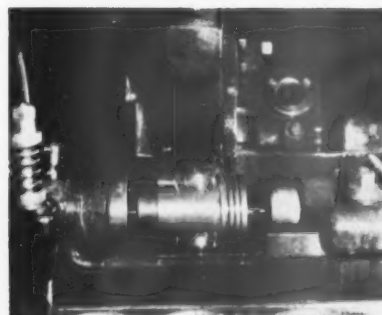
On a straight-8 this same machine is arranged to finish bore all 8 holes at a single pass of the tool.



THE *Heald* MACHINE COMPANY Worcester, Mass. U.S.

THIS MONTH'S COVER

GRINDING PISTONS *on the* CINCINNATI PLAIN HYDRAULIC GRINDING MACHINE



A close-up of the machine in action. Notice that the wheel covers the entire width of the skirt being ground.

Grinding Pistons on the Cincinnati Plain Hydraulic Grinding Machine

The cover picture shows a piston grinding operation on a Cincinnati Plain Hydraulic Grinding Machine in the plant of the Packard Motor Car Company, Detroit, Michigan. Six machines are being used, two of which are for rough grinding and four for finish grinding. All these machines are standard 10" x 18" Cincinnati Plain Hydraulic Grinders. Each machine is equipped with an Ohio Units cam attachment which adapts the machine to grinding ellipses. The two roughing machines are on one side of the conveyor line, while the four finishing machines are on the other side.

The pistons are cast aluminum, reinforced at the pin bosses by steel struts. A vertical slot in the skirt breaks into a cross slot under the

third ring groove. This construction permits the skirt to expand or contract with practically no restriction.

The skirt is ground to a perfect ellipse by the infeed or plunge cut method. The minor diameter of the ellipse coincides with the center line of the pin bosses, and is .006" smaller than the major diameter. Accuracy of the profile at any point on the diameter must be within .0015", and the skirt must be parallel with the center line of the piston, from top to bottom within .0003". The tolerance on parallelism is very strict, but it is not a limiting factor in production.

The Cincinnati Plain Hydraulic Grinding Machine is particularly adaptable to this job because of the standard hydraulic infeed device,

and because the operation being demonstrated is an ideal infeed or plunge-cut set-up. The 3" wide grinding wheel covers the full width of the piston skirt. Quick-acting retraction of the work a full $\frac{3}{8}$ " from the wheel at the end of the grinding cycle facilitates rapid loading and unloading of the work between centers. When loading, it is necessary to hand traverse the machine table about 4" to one side. This operation is very easy because of the hydraulically actuated hand control feature.

Two operations are required; rough and finish grinding. From .010" to .012" is removed during the roughing operation. From .004" to .005" is removed during finish grinding.

Easy!

on

Tungsten Carbide

No hammering required to unlock and relock McCrosky JACK-LOCK Wedge when blades are adjusted.

Adjusting screw behind each blade permits accurate and economical forward adjustment.



McCROSKY

Jack-LOCK

MILLING CUTTERS

with tungsten carbide tipped blades

Pat.
1,681
1,951

McCROSKY



Bulletin
No. 15-C

Complete details of JACK-LOCK Shell End Mills and medium and heavy-duty Face Mills with tungsten carbide tipped blades. Send for your copy today.

McCrosky Tool Corporation, Meadville, Pa

Sales Offices: Detroit, Cleveland, Chicago,

Philadelphia, New York, Syracuse, Toledo

NEW..

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HAYNES STELLITE J-METAL CUTTING TOOLS

Valuable Book

on machining

with Haynes Stellite J-Metal

A NEW reference book is just off the press, describing Haynes Stellite J-Metal cutting tools and discussing the following subjects:

The History and Development of Haynes Stellite; Materials Machined with Haynes Stellite J-Metal; Physical Characteristics of Haynes Stellite J-Metal; How to Grind Haynes Stellite J-Metal; How to Get Best Results with Haynes Stellite J-Metal; Recommended Speeds and Feeds for Haynes Stellite J-Metal; Standard Haynes Stellite J-Metal Cutting Tools; Special Haynes Stellite J-Metal Cutting Tools; Hard-Facing in the Machine Shop with Haynes Stellite.

You will note that this is not merely a new catalog—it is a comprehensive operating manual telling how, when and where to use Haynes Stellite J-Metal cutting tools to best advantage.

This manual contains 56 pages, 70 illustrations and 13 reference tables giving useful operating data. Forty-four actual production jobs are pictured and described with data on speeds, feeds, depths of cut and other pertinent information.

If you are in any way interested in machining operations, you should have this book. Assure yourself of your copy by filling out and mailing the coupon—*now*.

SEND FOR YOUR
COPY TODAY



HAYNES STELLITE COMPANY
Unit of Union Carbide and Carbon
Corporation
KOKOMO, INDIANA

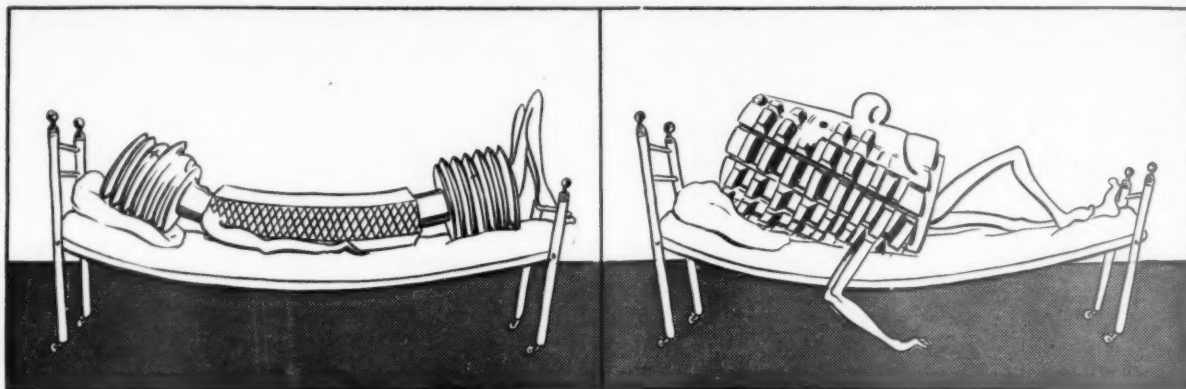
Please send me your new book, "Haynes Stellite J-Metal Cutting Tools." I understand there will be no obligation whatever.

Name

Firm Position

Address

TE-5/37



Concerning

3 SICK MEN

I found three men quite sick in bed,
Joe Gage, Tom Tool, and Mister Thread.

The question was, "What Doc to call?"
A Doc who's good; whose fees are small!

"Doc Comparator is your man,
He'll find your faults if any can."

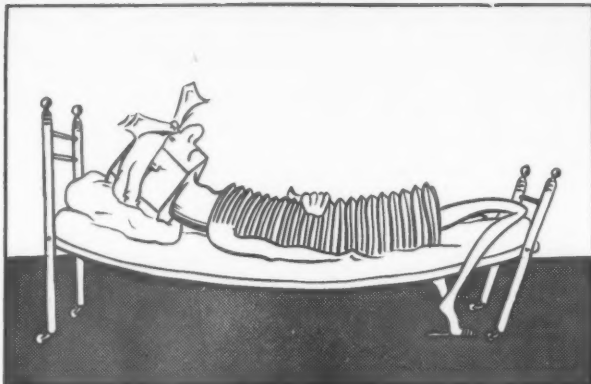
I got the Doc upon the phone,
He dropped it when he heard a groan.

That groan had come from Mister Thread,
Battered and bent 'til nearly dead.

The Doc came over right away;
To be on time might save the day.

He found their troubles quite severe,
But diagnosed without a fear.

When asked, "What was your find?"
His beaming face became quite lined —



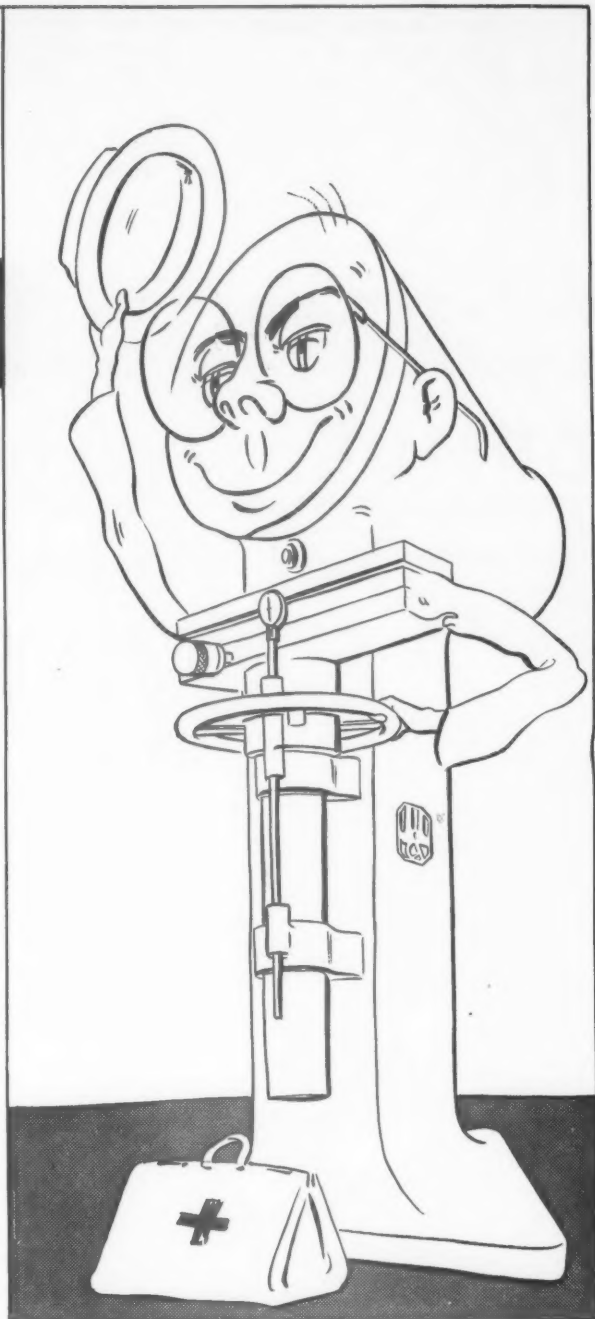
Said the Doc,

"The first I checked was Tommy Tool —
Distorted as can be.
Some find this hard to diagnose,
But it's an easy job for me.

"The tolerance on Mister Gage —
It wasn't nearly right.
His 'GO' was undersize,
His 'NO GO,' hardly tight.

"Mister Thread's a sorry sight,
Enough to make me frown.
His form was cut all out of shape —
That die head let him down.

"So I have checked your patients,
Their faults now plain to see;
And if they've further troubles,
Why not consult with me?"



JONES & LAMSON
MACHINE COMPANY
SPRINGFIELD, VERMONT, U.S.A.
•
THREAD TOOL DIVISION

A.S.T.E. Chapter News

(Continued from page 22)

The principal speakers of the evening were Mr. A. M. Johnson, Vice-President and Chief Engineer of the Barnes Drill Company of Rockford, Illinois, and Mr. Ronald S. Walker, Sales Manager of the same company.

The talks given by Mr. Johnson and Mr. Walker covered in general, practically everything concerning drilling, honing; or in other words, as they put it "Hole Finishing." The talks were fully illustrated by show-

ing five reels of films. These films showed their standard as well as special drilling and hydraulic honing machines doing various kinds of jobs in plants throughout the country. Multiple cylinder honing machines were shown that were equipped with an electric stroke counter and automatic liftout. Some special machines were shown in operation, one of which was a high production drilling machine, equipped with four vertical heads and one horizontal head, with five working stations and one loading station, to

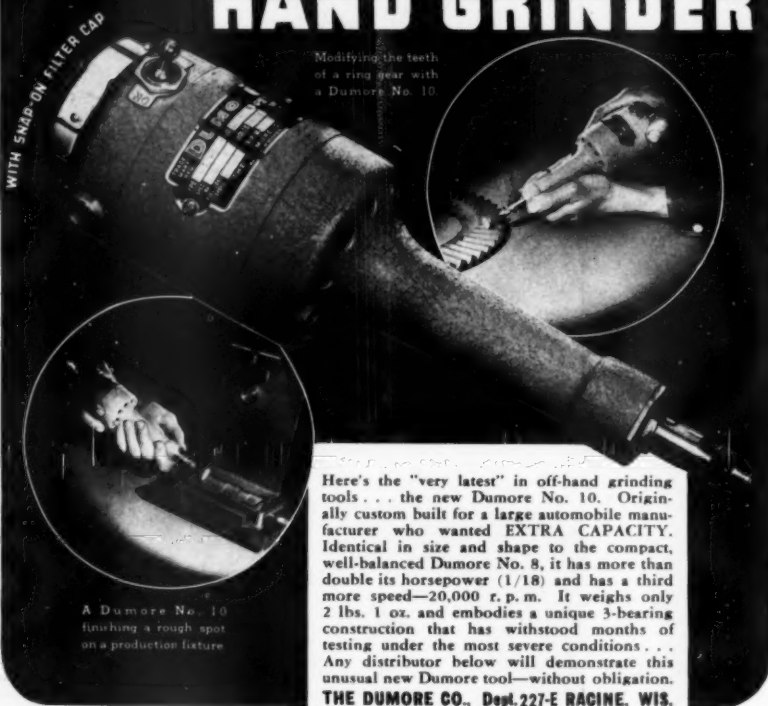
perform seventy-five operations in sequence on one side of cast iron pump bodies, and the job consisted of doing vertical and horizontal drilling, reaming and tapping. The pictures also indicated the operation being done and amount of pieces produced per hour.

During their talk concerning honing, they indicated the equipment has been able to hold work to an accuracy of one and one-half tenths of a thousand. It was also brought out that it is now possible to hone a hole as small as one quarter inch. It was also stated that they are now in process of building two of the largest honing machines ever built. It will operate horizontally to hone work about thirty inches in diameter by seventy-two feet long.

Numerous samples of work were on display, and questions from the floor, during the talk and after, were answered by Mr. Johnson and Mr. Walker, as well as by Mr. W. M. Fairbairn, General Superintendent of the Barnes Drill Company.

The meeting was well attended—about one hundred engineers and guests were present. The meeting was one of the most interesting of the season, and the officials of the Barnes Drill Company were thanked by all for the able and efficient manner in which they put it on.

DUMORE Announces a new MORE POWERFUL HAND GRINDER



Modifying the teeth of a ring gear with a Dumore No. 10

A Dumore No. 10 finishing a rough spot on a production fixture

Here's the "very latest" in off-hand grinding tools... the new Dumore No. 10. Originally custom built for a large automobile manufacturer who wanted EXTRA CAPACITY. Identical in size and shape to the compact, well-balanced Dumore No. 8, it has more than double its horsepower (1/18) and has a third more speed—20,000 r.p.m. It weighs only 2 lbs. 1 oz. and embodies a unique 3-bearing construction that has withstood months of testing under the most severe conditions... Any distributor below will demonstrate this unusual new Dumore tool—without obligation.

THE DUMORE CO., Dept. 227-E RACINE, WIS.

THESE DISTRIBUTORS STOCK DUMORE TOOLS

AKRON—Hdwe. & Supply Co.	ELIE, PA.—H. P. Waller Sup. Co.	MOBILE, ILL.—John J. Normore Co.	RICHMOND—Smith-Courtney
ATLANTA—Fulton Supply Co.	GRAND RAPIDS—Mrs. Sup. Co.	MONTREAL—Canadian Fairbanks-Morse, Ltd.	ROCHESTER, N. Y.—Erskine
BALTIMORE—L. A. Benson	GREENVILLE, S. C.—Carolina Supply Co.	MUSKOGEE, WASH.—Muskegon Hdwe. Co.	ROCKFORD, ILL.—Mid-States Indus. Corp.
BIRMINGHAM—Young & Van Supply Co.	HARTFORD—Hunter & Havens	NASHVILLE—Huford Bros. Inc.	SAGINAW, MICH.—Hatch Supply Co.
BOSTON—Chandler & Caragher Co.	HOLYOKE—J. Russell & Co.	NEW HAVEN—C. S. Marick	ST. LOUIS—Colcord Wright Machinery & Supply Co.
CHAMBERLAIN, CONN.—Hunter & Havens	HOUSTON—Wessendorf, Neime & Co.	NEW ORLEANS—Oliver H. Van Horn Co., Inc.	SALT LAKE CITY—Salt Lake Hardware Co.
CHATTANOOGA—Chattanooga Belting & Supply Co.	INDIANAPOLIS—Kilbuck-Dawson Sales Co., Inc.	NEW YORK CITY—Morris Abrams	SAN FRANCISCO—Harron, Richard & McConne Co.
CHICAGO—H. B. Bly & Co.	JACKSON, MICH.—Smith-Winchester Co.	NEW YORK CITY—Morris Abrams	SEATTLE—Cragin & Co.
CINCINNATI—E. A. Kinsey Co.	KANSAS CITY, MO.—Elfeldt Hdwe. & Mach. Supply Co.	ORLANDO, FLA.—Harry P. Leu, Inc.	SPRINGFIELD, MASS.—Carline Hardware Co.
CLEVELAND—Cleveland Tool & Supply Co.	KNOXVILLE—W. S. Murray Co.	PHILADELPHIA—Maddox & Co.	SYRACUSE—Syracuse Supply Co.
DALLAS—Briggs-Weaver Machinery Co.	LANCASTER, PA.—Bailly Bros. & Barb.	PITTSBURGH—Standard-Machinery Sup. Co.	TOLEDO—Cornell Supply Co.
DAYTON—C. H. Gouger Mach. & Tool Co.	LOWELL, MASS.—Nehas Mach. & Supply Co.	PORTLAND, ORE.—J. E. Haseltine & Co.	TORONTO—Canadian Fairbanks-Morse
DENVER—Hendrie & Bolthoff Mfg. & Supply Co.	LOS ANGELES—Ducumun Metals & Supply Co.	PROVIDENCE—Belcher & Loomis Hardware Co.	TRUITY, N. Y.—Fred K. Blanchard
DETROIT—Boyer-Campbell Co.	MILWAUKEE—W. A. Voell Mach. Co.	READING, PA.—Reading Machine & Tool Co.	TULSA—Mach. Tool & Supply Co.
CHAS. A. STEINER CO.	MINNEAPOLIS—R. C. Duncan		WORCESTER, MASS.—Walters

SPECIAL NOTICE

After a very successful series of monthly discussions, educational talks and dinner meetings which were graced with the presence of representatives of the ranking manufacturers of various types of machining methods and procedures of Tool Engineering which was most interesting to all members and their friends; the Racine Chapter of the A.S.T.E. on Friday, June the fourth at Meadowbrook Country Club of Racine are throwing a Jamboree.

All of the members and friends will remember the Frolic they had last year at the same place and how much they enjoyed playing golf, baseball, cards and all the other games they funned at.

Dinner will be served at 6:30 and all prizes will be awarded at that time to the lucky winners.

All the members of the A.S.T.E. who are or may be in this vicinity are cordially invited to attend this party and help Racine Chapter wind up a very satisfactory season in a Blaze of Glory.

Members are asked to make their reservations early and not later than June the second so that every one attending can be shown true hospitality.

H. Springborn, Sec'y Racine Chapter
1615 St. Clair Street, Racine, Wis.
Phone—Prospect 2604-M



Station Type Machines HOLEUNIT Construction

• Illustrated above are two NATCO station type machines built of NATCO HOLEUNITS. The machine at the left is performing a total of 42 drilling, countersinking, rough boring and facing, rough and finish reaming and milling operations on 120 cylinder blocks per hour. Eighty-four operations are performed with each cycle of the machine . . . forty-two operations on each of two blocks every 60 seconds.

• The machine shown at the right is performing 14 drilling, countersinking and tapping operations on each of two blocks . . . a total of twenty-eight operations

every 60 seconds and a production rate of 120 blocks per hour is being maintained.

• These machines, two in a "line" of four such machines being used by this motor manufacturer, are built of steel columns and bases. Each machine is provided with a six position automatic indexing table. The first machine is arranged with 7 NATCO HOLEUNITS (5 vertical and 2 horizontal) and the second machine is arranged with four NATCO HOLEUNITS (all mounted in a vertical position).

• It is true these machines were engineered for specific multiple operation jobs . . . yet they are built of HOLEUNITS which are flexible and interchangeable. They are standard in every respect . . . and may be altered and rearranged as required with a minimum of expense.

• NATCO HOLEUNITS are built in a variety of sizes and capacities. Investigate them today. Call, wire or write for a NATCO representative.

Chicago Office, 2009 Engineering Bldg.
Detroit Office, 409 New Center Bldg.

THE NATIONAL AUTOMATIC TOOL COMPANY
Richmond, Indiana, U.S.A.

**Reduce
Production Costs!
Investigate
Today**

NATCO

Drilling, Boring and Tapping Machines

Accurate Balance Important

(Continued from page 13)

ally by remote control from the conveniently located switchboard without touching the vibratory cradle.

It is then necessary only for the operator to increase the unbalance in the compensator, also by remote control, until the unbalance in the part is completely counteracted, when the cradle will cease vibrating and such condition will be clearly shown on the spark dial. The operator then stops the machine and reads the amount and angular

position of the compensating unbalance directly from the compensator, and is then able to apply the proper correction.

Inasmuch as it is necessary to apply corrections in two planes, normal to the axis of the part, to get perfect static and dynamic balance, readings as above are taken for each correction plane, the pivots about which the vibratory cradle oscillates, having been placed in the two correction planes. When taking a reading for either correction plane, the pivot in that plane is

released, and the pivot in the other plane locked, and the cradle oscillates about the locked pivot. With this procedure readings taken or corrections made in one plane will not affect the readings or corrections in the other plane, inasmuch as the unbalance or corrections in the plane of the locked pivot has zero moment arm along the axis of the part being balanced.

In the machine illustrated in Figure 1 a crankshaft set up for dynamic balancing and correction by drilling in the two end counterweights, is shown.

Machines of this type are used in many industries for balancing engine crankshafts, fly wheels, clutches, electric motor and generator armatures, turbine rotors and similar rotating parts where an accurate static and dynamic balance is absolutely essential to insure smooth running at high speed, with a minimum upkeep cost.

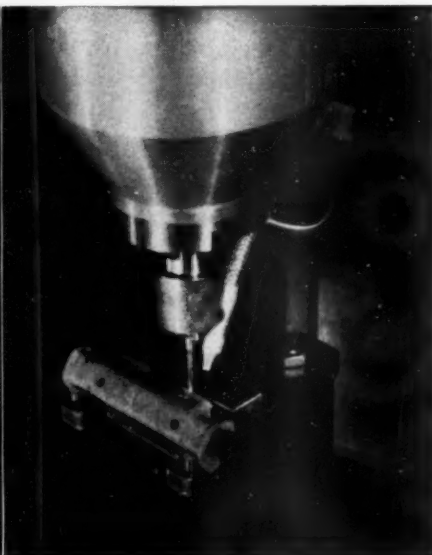
This type of machine is made in various sizes suitable for balancing parts varying from 25 lbs. to 10,000 lbs., or more in weight, and up to 9½ feet or more in diameter. When used for balancing parts in the production line, a suitable correction chart, made up especially for the particular piece in question, is generally used, showing the proper correction to apply, immediately upon taking the machine reading.

Balancing Lighter Parts

For accurately balancing lighter parts down to as little as 3 or 4 ounces total weights, a Vibro-Electric self-indicating type, static and dynamic balancing machine, similar to Figure 2, is made. In this machine, as in the compensating type machine the part to be balanced is carried in supporting rollers on a vibratory cradle, but instead of compensating for unbalance in the piece with an artificial unbalance, in this machine, vibration of the cradle causes an indication on the meter which is directly proportional to the amplitude of vibration, and hence to the unbalance in the part. The angular location of the unbalance or correction, is quickly indicated on the graduated dial just below the meter, by turning the dial with the knob depressed until the meter reads zero.

There are numerous other special adaptations and variations of the two main types of balancing machines discussed here, all developed to accurately balance some special type of rotating part, to improve its performance.

**Tapping
4 DIFFERENT
HOLES at
2 DIFFERENT
ANGLES in
1 Operation**



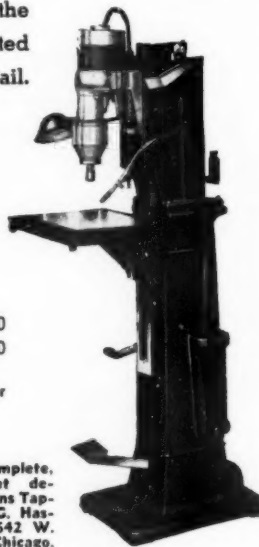
A simple swing fixture permanently fastened to the table! Foot pedal control! Both of the operator's hands left free to guide the work! No wasted motion. No lost time in locating or positioning. A job that took more time to handle than to tap . . . by the old method. A job made simple and easy by the exclusive Haskins Features. Our new, illustrated booklet describes the Haskins Tapper in detail. It's full of new facts on tapping.

ILLUSTRATED ABOVE—One of a Series of Case Histories Showing Tough Jobs Made Easy by The Haskins Tapping Method.

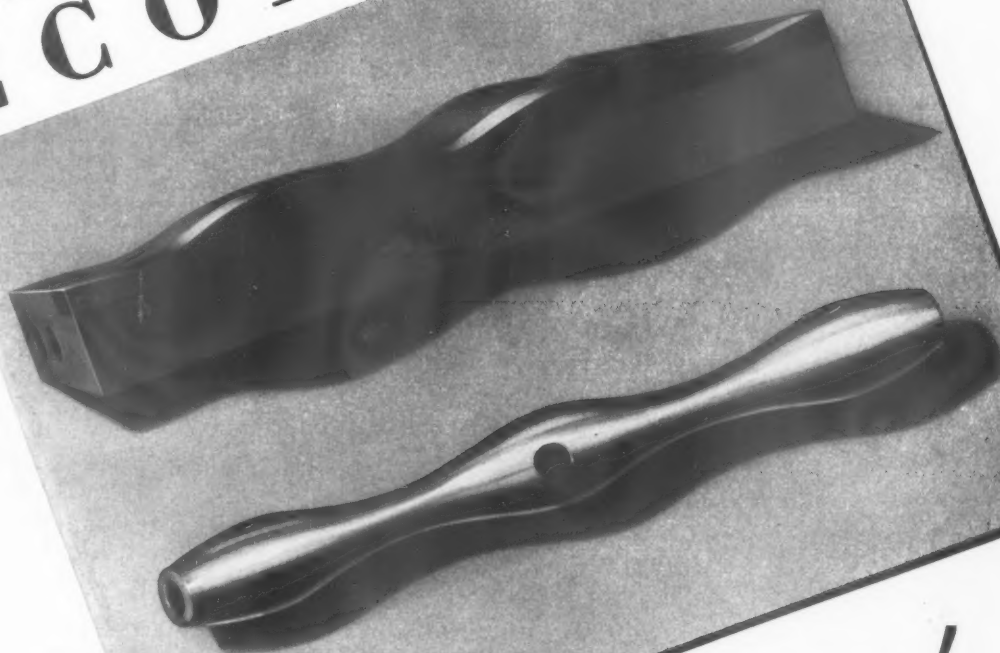
Material—Steel Stamping	R.P.M. of Tap "In"—1750
Size of Tapped Hole—10-32"	R.P.M. of Tap "Out"—3500
Depth of Tapped Hole 3-32"	Production (4 holes)—
	480 pieces per hour

Haskins
Hi-Speed TAPPING EQUIPMENT
with Greater Adaptability

Write for a complete, illustrated booklet describing the Haskins Tapper in detail. R. C. Haskins Company, 4642 W. Fulton Street, Chicago.



Firthite ECONOMY



\$2625 INDIRECT SAVINGS!

FIRTH-STERLING PRODUCTS

Firthite Sintered Carbide Tools
Firthite Sintered Carbide Blanks
Firthaloy Wire Drawing and Extrusion Dies
Circle © Super High Speed Steel
Blue Chip High Speed Steel
Tungsten Hot-Work Steels
Cromovan Triple Die Steel
Invaro Oil-Hardening Steel
C. Y. W. Choice Hot-Work Steel
Special A. S. V. Steel
Firth Winged Ingot Steels
Sterling Stainless Steels
Sterling Nirasta Steels
Globe Drawn and Ground Bars,
Drill Rod and Wire
Firth-Sterling Special Tool Steel
Tool and Die Steels for Every Purpose

The superior finish—free from tool marks—made possible by FIRTHITE, has reduced grinding and polishing costs on a cast brass plumbing fixture from $8\frac{1}{2}$ cents to $3\frac{1}{4}$ cents per piece. The $10\frac{1}{4}$ -inch skiving tool tipped with FIRTHITE was especially designed for form turning these fixtures. This \$181 FIRTHITE tool has saved \$2625 in polishing costs on the first two grinds during which it produced 50,000 finished pieces of work. It is estimated that the tool can be resharpened at least fifteen more times producing 25,000 pieces per grind which at the present rate of saving will return nearly \$20,000 on an original investment of less than \$200.

Although this job is somewhat unusual, every FIRTHITE installation is effecting worthwhile economies. No installation is too difficult for us to consider, and we welcome your inquiries.

FIRTH-STERLING STEEL COMPANY

Works: McKEESPORT, PA.
NEW YORK CHICAGO HARTFORD
CLEVELAND DETROIT LOS ANGELES
PHILADELPHIA DAYTON
GLOBE WIRE DIVISION, McKEESPORT, PA.

Letters

746 Kearny Avenue,
Arlington, New Jersey,
March 8, 1937

American Society of Tool Engineers,
Detroit, Michigan.

Dear Mr. Brunner:

Enclosed find money order for dues for 1937, and by the way I may as well tell you

that "The Tool Engineer" has become very popular with everybody at Oxweld Acetylene Company (Div. U.C.C.) here in Newark where I am employed.

It goes 'round and 'round the production engineering department, and when it comes back to me, oh, oh, oh;—it brings tears to my eyes to tell you what it looks like. It seems like everybody keeps a razor blade handy to cut out what they want. There is hardly anything but the cover left, so will you please send me some application blanks for memberships. I would like to keep my copy of "The Tool Engineer" intact if at all possible.

Yours truly,

Robert Berg

We hasten to inform our readers that this is not a "paid testimonial" although we certainly appreciate your sentiments, Mr. Berg. We'll see that you get extra copies of "The Tool Engineer" from now on.—Editor.

1200 Carlisle Avenue,
Racine, Wisconsin

Dear Sir:

The article "Size Measurement of Gears" appearing in the January issue interested me very much, as it dealt with a problem we had been working on at the Nash-Racine plant.

The information and solution pertaining to spur and helical gears is clear and concise, but I wonder if the table on involute functions contained in Prof. Buckingham's book is available separately or whether it could be obtained from any other source.

I would appreciate any information you could give me regarding this matter. Thank you.

Yours very truly,

Robert Benson

Prof. Buckingham's book, containing the tables on involute functions, is available from the Industrial Press, 148 Lafayette Street, New York City, the publishers. Price \$2.50.—Editor.

In the massive tailstock a full length bearing is provided for the spindle equal to the maximum overhang. Handwheel placed at convenient angle. Movement is through a worm and worm gear with thrust of worm against ball bearing. Tailstock spindle hollow with same diameter hole as head spindle. These are but a few of the superiorities of the LeBlond tailstock.

The R. K. LeBLOND
MACHINE TOOL CO., CINCINNATI, O.
20 North Wacker Drive, Chicago 103 Lafayette St., New York

For almost a half century LeBlond Heavy Duty Lathes have been accepted as the standard of excellence. Constant improvement in design and operation, the incorporation of every new development, have maintained LeBlond leadership and given industry lathes that are unmatched in performance, unequaled in value.

You will find it to your profitable advantage to standardize on LeBlond... to enjoy the economies possible only with these superior lathes. Write for fully illustrated brochure.

104 Tulsa Building
Telephone 2-2766
Tulsa, Oklahoma

American Society of Tool Engineers
Detroit, Michigan
Gentlemen:

We have received "The Tool Engineer" and find it very interesting to the many that visit our office and sales room lobby where we have facilities for our visitors to avail themselves of our reading room and display of all tools and utilities we represent.

We believe that this society could be originated in this country to advantage while not a large membership but a start to grow with increasing industries. We believe we could create some additional subscriptions for you by furnishing one copy only of a certain month, either of February or March to the key men in each plant with our compliments.

As the Engineers Club consisting of the A.S.M.E., S.A.E. and ten or twelve other associations connected with oilfield Equipment, is the second door from our offices in the Tulsa building, their Mr. J. H. Englebrecht, Secretary for all the associations in connection with the Engineer's Club could organize a chapter of the A.S.T.E. of which a part of our organization would take membership to start off with and as there are about thirty manufacturing plants in Tulsa alone all have tool problems and needs and need advanced tool efficiencies, your chapter would be valuable.

Kindly advise us what you think of this suggestion.

Waiting your action, we remain,

Yours very truly,

GRB:M

George R. Brammer

We shall be very glad to work with you Mr. Brammer, in the chartering of a branch of the A.S.T.E. for your area. Full details have been sent to you by letter.—Editor.



ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3709

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Sundstrand Builds Oil Groover Automatic—Handles Twelve Sizes

Shown in Fig. 1 are two halves of steel-backed babbitt-lined bearings; one plain, one flanged. These are made in twelve different sizes. Manufacturer

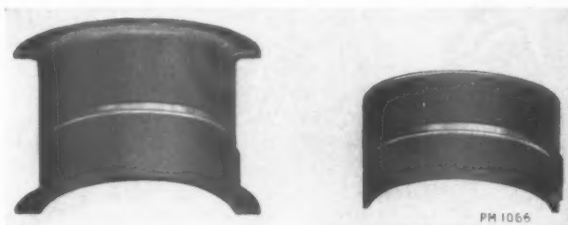


Fig. 1 — Steel-backed babbitt-lined bearings in two types and twelve sizes grooved automatically.



Fig. 2. — One of two Sundstrand 3-spindle Automatic Oil Groovers for milling the bearings shown in Fig. 1.

wanted new and better equipment for milling oil grooves in these bearings, asked Sundstrand Engineered Production Department for suggestions. The Sundstrand 3-spindle oil grooving machine shown in Fig. 2 is the result. Neat, compact, automatic, fast, accurate—this machine has magazines adjustable to both types and all of the bearing sizes. The spindle heads, of unit design, have planetary drive readily adjustable to each different bearing diameter. Work-pieces are fed into place, located accurately, clamped securely, milled within required limits, released and discharged—all automatically. Operator merely keeps magazines loaded, an easy job but steady work—machine keeps him busy.

Each of these oil groovers installed replaces four or more of the machines used previously. Write us for additional information and data on this installation. Figure for yourself the savings in floor space, labor, and operating cost. Let Sundstrand Engineered Production figure on standard or special equipment for your milling and turning operations.

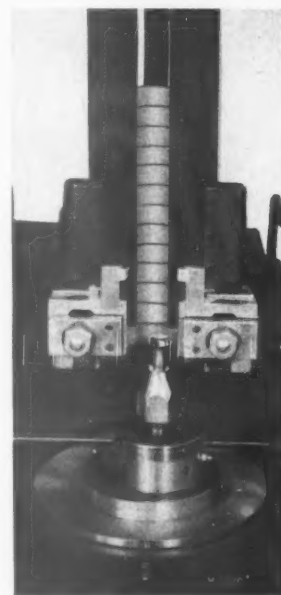


Fig. 3 — Close-up of planetary spindle, magazine and clamping fingers. Note unit design adjustable for various types and sizes.

SUNDSTRAND MACHINE TOOL CO.
2532 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

RIGIDMILS - STUB LATHES
3-Wheel Tool Grinders - Centering Machines
Hydraulic Operating Equipment - Special Machinery



TRY-OUTS

"About the worst thing we have had so far is the Brain Trust. We were told that the Ph.D.'s (Piled Higher and Deeper), were coming out of their academic slugs to teach us the ABC's. I might have been more impressed if I hadn't been a college professor. I know how little they know because I have been one. They started out and they started

doing things with the alphabet. Now, don't misunderstand me at all. I am not saying anything at all against the alphabet. I think the alphabet, in moderation, is a very good thing. There was the Tool Engineer who left home and after he got on the train he discovered that he had forgotten a very important part of his wardrobe so he wired to his wife: 'SOS BVD COD PDQ.' It is very useful at times. The professors have cooked up so much alphabet soup that we have run out

of letters. There are two CCC's in Washington. The Civilian Conservation Corps and the Commodity Credit Corporation. A man who wanted to get in one of these camps wrote a letter to the Civilian's Conservation Corps and he addressed it to the CCC and they sent the letter to the Commodity Credit Corporation and they sent him a check for \$10,000.00. Of course, that was all right because that was part of the distribution. But imagine the embarrassment of the chap who had some commodities on which he wished to get a loan and he wrote the CCC and the letter was sent to the Civilian's Conservation Corps and he found himself a thousand miles from home cutting down trees. The plan of economy or living a more abundant life.

"Now the fourth fear is the fear of failure. It is really a fear of oneself. Fear of not being able to do the job. Fear of not being able to accomplish the task set before them. Shakespeare expresses it well when he says our doubts are traitors and make us lose the good we oft might win by fearing to attempt. I have a friend who was at the head of one of the largest industrial concerns in the City of Cleveland. He told me one time that he had never yet gone into a business conference where he had to put over a proposition that a great fear didn't seize him of his own inability to do what he was supposed to do. You would never suspect it to look at him. You would think he would be absolute master of himself. And yet, he assured me that it was true. I am glad to know you men here are recognizing the importance of public speaking. I understand you have a class here. Having been a teacher of public speaking I am naturally impressed with its value and importance. It is a splendid thing to be able to stand up and express yourself. I am glad to know that it is a part of your organization to follow out that line. These are days when it is hard to tell whether we are making any progress. There was a man arrested for speeding and the officer accused him of going fifty miles an hour. The judge asked him what he had to say for himself, and he said, 'In the first place the car won't go any more than forty miles an hour down hill, and besides it was raining and I always go ten miles slower under those circumstances, and my wife was with

**JOE'S UP
IN THE AIR
AGAIN!**

And who wouldn't be—with these pesky pins that don't fit. Get 'em halfway in and they're stuck—and so are you! Try and get 'em out! It's good economy to spend just a few more pennies and be sure of the accurate fit you get with Genuine Danly Dowel Pins.



DANLY DOWEL PINS FIT PERFECTLY EVERY TIME



• A few cents more, sure, but they're worth it because they are accurately ground to within one ten-thousandth of an inch. That means a perfect fit. They're made of a special steel, carburized and hardened. All diameters made in two sizes: The Standard being (.0002) two ten-thousandths of an

inch, and the Oversize (.001) one thousandth of an inch over listed diameters.

Danly Precision Dowel Pins eliminate delay—there is no trying or fitting—no lapping of holes—they save you time and money. Try them next time and see the difference.

DANLY MACHINE SPECIALTIES, Inc., 2114 S. 52nd Ave., Chicago, Ill.

513 E. Buffalo Street, Milwaukee, Wisconsin

Long Island City, N. Y., 36-12 34th Street
Dayton, Ohio, 930 E. Monument Avenue
Detroit, Michigan, 1549 Temple Avenue

Rochester, N. Y., 16 Commercial Street
Cleveland, Ohio, 1444 E. 49th Street
Philadelphia, Pa., 3913 N. Broad Street

DANLY

**DIE MAKERS'
SUPPLIES**

(Continued on page 38)

HOBS MUST BE SHARPENED CORRECTLY

BARBER - COLMAN Hob Sharpening Machines do this job perfectly at Low Cost

The photograph used for the background of this page shows the hob sharpening department of a large tractor plant in which ten Barber-Colman Hob Sharpening Machines maintain accuracy, insure high quality, and cut costs. See reasons outlined below.

Dull hobs will not produce accurate work or fine finish, will reduce production and increase costs. Hobs sharpened incorrectly will produce inaccurate work. Consequently, for maximum effectiveness and economy, hobs must be sharpened correctly. Barber-Colman Hob Sharpening Machines do this job at low cost because they restore the original cutting qualities, accuracy of tooth-spacing, and angle of tooth face, if any. And why not? At least 75% of all the hobs made in the United States are sharpened on Barber-Colman machines before shipment. Economy? One installation of 9 Barber-Colman Hob Sharpening Machines requires only 2 operators, saves 7 men on each of 2 shifts, will pay for itself in about 170 working days. Barber-Colman Hob Sharpening Machines are made in two sizes for straight- and helical-gashed hobs and formed cutters. Investigate. Write today for complete information.

BARBER
B-C
COLMAN

PRODUCTS

MILLING CUTTERS,
HOBS, HOBBING
MACHINES, HOB
SHARPENING MA-
CHINES, REAMERS,
REAMER SHARP-
ENING MACHINES,
SPECIAL TOOLS

BARBER-COLMAN COMPANY

General Offices and Plant ROCKFORD, ILLINOIS, U. S. A.

Represented in the Detroit Territory by HODGES MACHINERY CO., 544 New Center Building

Observations on Gaging

By **FRANK PRICE**

Gage Engineer, Dodge Plant
Chrysler Corporation

The practice today, in all manufacturing industries where assemblies are made, is that positive gaging uniformity must be maintained because interchangeability of parts are often required and the human element is an alibi well established for many inconsistencies.

This brought about the placing of an experienced gage man as gage engineer of each large industry through whose hands the policy

and design of all types of gages must pass to obtain this uniformity in checking of similar parts. The making and repair of gages is likewise controlled by him so no one can disturb the system after it is once established.

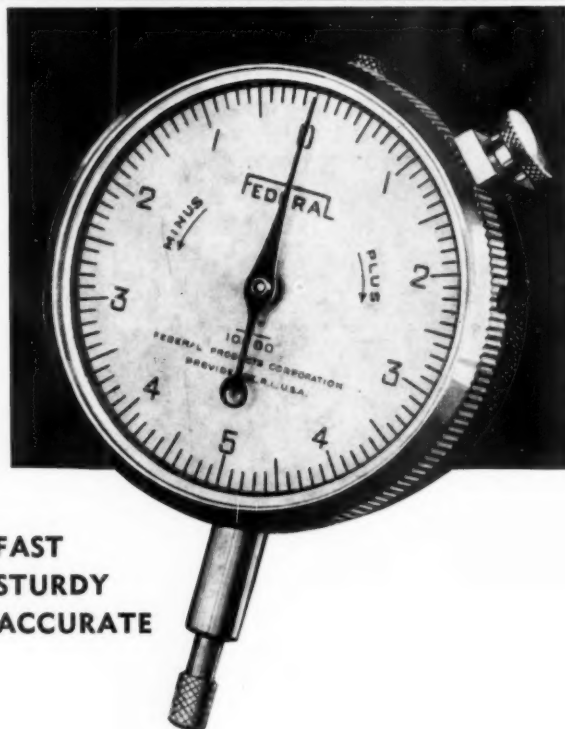
The adaptability of the various Electric Unit Type gages now available for shop use has eliminated the necessity of using amplification type gages in the larger industries. This has helped the operator as well as the inspector to control the close tolerances required in modern industry. The gages used in the

machining of each step in the manufacture of a part for automobile production are of great importance to the operators of the machines as well as to inspectors, who check the finished product. If the proper allowances of stock to be removed are controlled by good shop practice through the medium of gages on each cut taken, then the finished part will be properly completed and interchangeable.

In the planning of gages the primary things to consider are simplicity, lightness for handling, means of replacing wearing surfaces, proper provision for adjustment if an engineering change should occur and the proper sequence of points from which the control of sizes are taken. The manner in which the part is related to an assembly is of first importance in judging the gaging points of the final stages of checking. This permits making allowances on such open dimensions as are governed by the assembly. Also, care must be used in noting the surfaces from which the part is located when machining so as not to gage from the wrong surface and double up on the tolerances in the final stages.

Due to the present method of building steel auto bodies the gaging of each step of the sub-assemblies, and by steps into the larger assemblies of the body causes considerable care to be taken in planning the gages to control these pieces as they are made. In reality, each fixture as used becomes in itself a gage as each part is held in final assembly shape or contour as each step of assembly is made, thus holding the shape all through the process of welding or riveting these units together.

The various standards established by the American Gage Standard Bureau have simplified the reworking of standard type gages on annual model changes of car parts, where formerly a large portion of our gages became scrap when these change-over points arrived.



**FAST
STURDY
ACCURATE**

FEDERAL

DIAL INDICATORS

Send for New Catalog No. 36D

FEDERAL PRODUCTS CORP.

1142 EDDY STREET, PROVIDENCE, R. I.
DETROIT • CHICAGO • MUNCIE • CLEVELAND • NEW YORK

Try-Outs

(Continued from page 36)

me and she won't let me drive over twenty-five miles an hour and in the fourth place—" And the judge said, "Wait a minute, I am going to fine you \$15.00 before you back into somebody."

Quoted from the address of Chas. M. Newcomb

FIBRO FORGED SCREWS

A substantial advancement made in the manufacturing of SOCKET SCREWS. Originated, developed and patented by Holo-Krome.

The industrial evolution brought about increased production, high speed machinery far in advance of the machinery in use even a few years ago. Development engineers everywhere were devising their efforts to improving and perfecting high speed production machinery so necessary in this new industrial era.

Old methods had to be discarded. These major advancements in machine designing and building had to be matched with like improvements in the parts used in these new machines, and for their maintenance.

Holo-Krome engineers quickly and steadily seeking ways by which socket screws might be improved, believed that improvements in material and heat treatment alone were not sufficient to meet the demands of modern machines. New and better methods of manufacturing should be employed—modern machines and

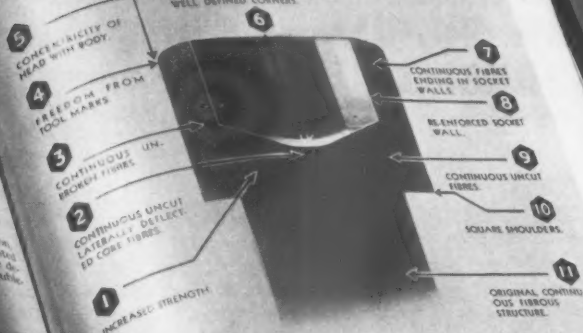
From their clear understanding of the problems of the present day, their thorough knowledge of the wide use of their products and the Unfailing Performance required of them in today's high production fields, Holo-Krome engineers originated and developed a new method of manufacturing. This new method has resulted in an entirely new product offered to the public in the Holo-Krome FIBRO FORGED Screws.

FIBRO FORGED Screws are combined Controlled Grain Size and the Unfailing Performance required of them in today's high production fields. Holo-Krome engineers originated and developed a new method of manufacturing. This new method has resulted in an entirely new product offered to the public in the Holo-Krome FIBRO FORGED Screws.

Atmospherically Controlled Heat Treatment, and new advantages of today's known improvements in manufacturing.

Highlights of FIBRO FORGED SCREWS illustrated on facing page.

SOCKETS—UNIFORMLY ACCURATE TO FULL DEPTH OF HOLE—TRUE HEXAGONAL SHAPE—DIAMETERS IDENTICAL TOP AND BOTTOM—SMOOTH REGULAR WALLS—WELL DEFINED CORNERS.



Some of the Dominating Reasons Why FIBRO FORGED SCREWS, patented by Holo-Krome give Unfailing Performance

New Catalog Now Ready

Write Engineering Dept. for Catalog No. 20

HOLO-KROME FIBRO FORGED Socket Screws

Special Analysis Chrome Nickel Alloy Steel—an entirely new and better method of manufacturing resulting in Continuous Fibres—Controlled Grain Size—Atmospherically Controlled Heat Treatment—plus TEN-TOR Testing (an exclusive Holo-Krome achievement) to determine the necessary physical properties. The Standards of Value users demand when buying Socket Screws.

DESIGN ENGINEERS

The New Catalog (8½" x 10⅝") sent only on request, contains 38 pages of Socket Screw Data, tables, Application illustrations and the Approved Hexagonal Type Socket Screw Standards. The Standards alone are worth the writing! Ask for your copy today!



Socket Head Cap Screw



THE HOLO-KROME SCREW CORP., HARTFORD, CONN., U. S. A.

HANDY ANDY'S ..WORKSHOP..

Now about that swansong—oh, all right, all right! But what I started to say: I've been rejuvenated, effects guaranteed to last a year. (Barring recall) Let's go!

After seeing the pictures of the big telescope the Welding Engineers have been playing with, I concede that there may be two sides to "Cast Iron vs. Fabricated Steel." Just think!—welding a gadget 40 ft. dia. $\pm 1/16$ "withaslight-roughingcut." But seriously, these welding engineers deal in modern miracles. I'm for 'em.

You know, after the hospitality extended us by the Toledo boys, I feel like moving into the suburbs. This hectic city life gets a guy. Oh well, a bit o' joshing between friends puts life into the party. At that, Toledo claims one distinction

—that some of its plants are still run by management. (By the way, we take pattern makers, too, if they're regular guys and are interested in promoting good tooling. Heck, we couldn't get along without 'em.)

Mr. Ralph Carpenter's talk, down in Toledo, about the pioneers in Tool Engineering (they were weaned on clam chowder, in case you don't know it) started a train of reminiscence. We have a lot of friends in common, some still going places, others having laid down their tools for the long, long rest. But they all made their impress on a great, new social and economic order, an order that, when all is said and done, is the most revolutionary and the most progressive in human history. There is great work ahead for the men who tool the world.

This fellow Zerkle, now, from Cleveland—did you really think he had anything on me as a speaker? They laughed at me when I sat down to the piano, but look what I did after one lesson at the Speakers Club (Detroit)! By the way, you

boys from across the lake go after Ernie Riemenschneider, Midland Steel (Cleveland). He's a regular feller and will make a good member.

I see by the minutes where ASTEers Kotersall and Fintz claim that they were the "instigators" of Cleveland Chapter. What do you mean, "instigators"? Listen, Rudy, let bygones be bygones.

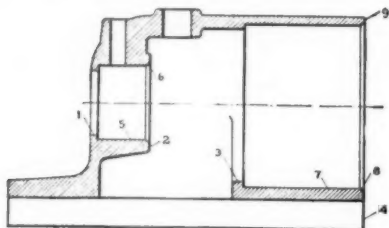
We will now pause 30 seconds in silent prayer for all A.S.T.E. secretaries. Be patient with 'em, men—they're sorely tried.

Wonder what in heckelfelt this "Marvelous Manufacturing Machine" is that Ent. Ch'man Elberty of Pittsburgh has put over. Maybe the guy is trying to steal my idea for a draftsman's chin rest. Get the lowdown and let me know.

Speaking about tools, one of the boys told me that they have some two hundred women in the tool

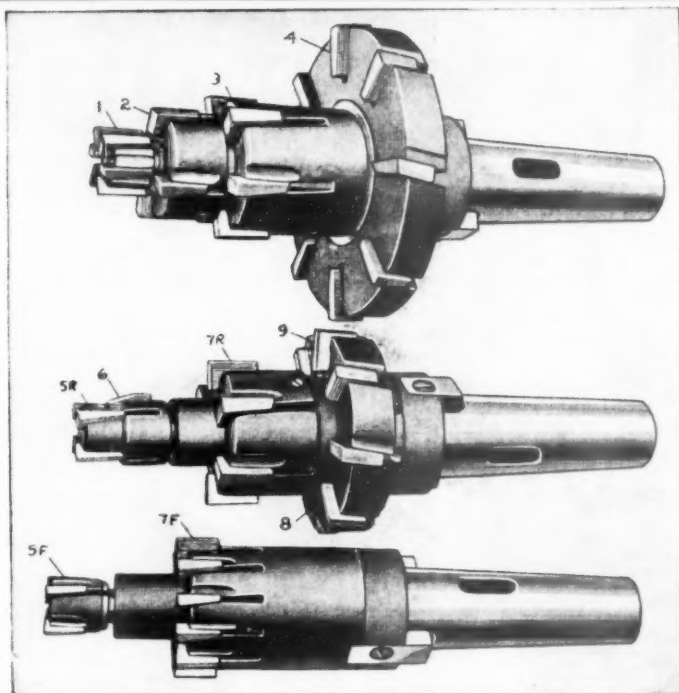
(Continued on page 42)

Set Up for Profit! MACHINE CASTINGS IN SEQUENCE



The pictures tell how one manufacturer machines and finishes small motor housings with OK Combination Tools. The cuts are numbered: "R" is roughing, "F" finishing. His saving was most remarkable! We have designed hundreds of such set-ups for manufacturers—to their complete satisfaction and certain profit.

Describe the part you wish to machine, the material, quantity, and your machine tool equipment, and our engineers will submit a design for your special need. If you have the work, an OK Combination Tool set-up will pay for itself in an amazingly short time, after which the saving is PROFIT.



SYSTEM

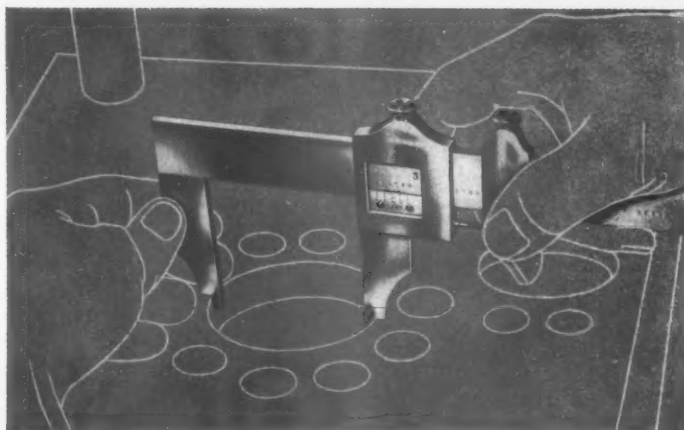
OF INSERTED-BLADE METAL CUTTING TOOLS

Manufactured Only By
THE OK TOOL CO.
SHELTON, CONN.

Exactly 2.400"

There are no "ifs, ands or buts" about a reading from the vernier on a Starrett Shop Equipment Tool. The clean, sharp graduations say what they mean clearly and distinctly. And that goes for Starrett Micrometers and Dial Indicators, too.

An investment in Starrett Shop Equipment Tools is an investment in greater accuracy. That's why it pays to standardize on Starrett. You'll find anything you need among the more than 3000 fine precision tools and dial indicators shown in the revised edition of Starrett Catalog No. 25T. Write for your copy.



THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

*World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—
Steel Tapes, Standard for Accuracy*

Standardize on

STARRETT TOOLS

BUY THROUGH YOUR DISTRIBUTOR

WE ASK YOU --



Are your roughing inserted tooth face mills designed for maximum blade life?

They would be if you were using the

G & G inserted cone type design.

The adjustment is positive and uniform, making it unnecessary to scale each blade as it is set out, as well as being in the direction to compensate for major blade wear.

THINK IT OVER

GODDARD & GODDARD CO.

DETROIT

Handy Andy's Workshop

(Continued from page 40)

hardening shop of one of our large manufacturing plants. Yeah?

Met an old acquaintance down in Toledo. (I won't mention his name, but have an idea that from now on we'll be old friends. Eh, Red?) Anyway, I've a hunch that, having read some of the stuff I write when in a serious mood, he had considered me an obstructionist or reactionary until the idea clicked that this Middle Way of the A.S.T.E. is the road to progress for us Tool Engineers. Now, he is coming in as a member, and take it from me he'll go places with us.

As previously mentioned, one of my failings is that I have to hear a name three times before it clicks; even at that I work a system. For instance, if a guy's name is Stone I think of something hard. Then, when we meet again, he'll be Flint, Steel or maybe Irons. So don't be surprised if next time I meet Mr. Seeman of Toledo I call him Mr. Gobb. I wish I knew what makes me that way.

At that, Walt Seeman will stick in

my memory. A very likable, personable chap, with a talented family. The nimble feet of his little girl tapped a responsive tempo in the hearts of the Toledo guests. Now, there's an ideal—doubtless there is plenty of talent among our A.S.T.E. families, something just a bit different and a bit better. Let's encourage it.

Between rounds, down in Toledo, I saw, nodded to and shook hands with oodles of Stones, F(int)z, Irons, etc., among them Homer Brown, "Slim" McClellan, our jovial cheer and song leader, Al Nancarrow of Universal Sales, Bill Scheer of Swedish Gage and Sid Randall. (We gave him a job.) You'll find others mentioned here and there.

Speaking of rounds, you drink Swedish punsch (not punch) with the elbow horizontal and the glass touching the second button. Then say Skoal!

Next time you Hartford boys meet, drink a silent toast to B.M.W. Hanson, a pioneer in Tool Engineering. There was a man!

So Cleveland has a balance in the bank, like Milwaukee! Well, that is

good competition. On your toes, everybody.

I see where P. F. Rossback, Cleveland Ed. & Pub. man, wants all info. re items of interest in by the 15th of each month. Good stuff, ol' timer! And now, you get it to us on time. At that, you all did fine this month. Thanks—but don't rest on your laurels.

I note that Joe Barnett is made Chairman of Detroit Student Chapter. Nice chap, Joe—one of my boys, by the way. And they have a lady secretary!—Miss Margaret Cecil. Welcome, Miss Cecil—and we surrender to the inevitable. I mean, of course, the refining influence of the feminine element. And Ray Murphy—look me up sometime, Ray.

Gosh, I'll be glad when this Old Gold contest is over. The whole family is in it and the pace is too stiff.

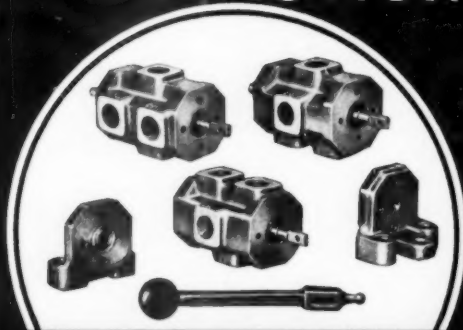
In closing let's all give our moral support to Bill Gray, fighting it out at home now, since leaving Henry Ford hospital. A great guy. We're with you, Bill.

Handy Andy.

"LOGAN"

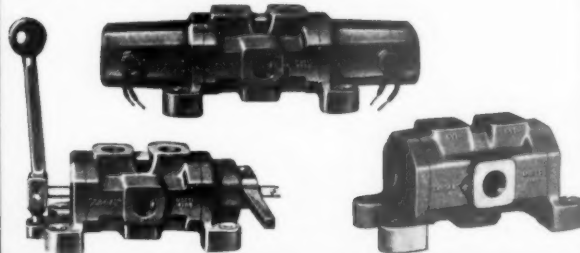
HYDRAULIC VALVES

SAVE
TIME
EFFORT
MOTION



NEW Logan Hydraulic Control Valves are now available with Balanced Four Way Piston Type Construction for hand, foot, solenoid, cam, pilot or latch operation. The body (pictured at the left in three positions) is so designed that it may be rotated in relation to the end covers, easily bringing the several pipe connections into the position required for the most efficient piping.

This adjustable feature eliminates the use of special valves, reduces internal friction, fitting and labor costs. Write for complete Hydraulic Valve Catalog.



LOGANSPORT MACHINE INC.,

LOGANSPORT, IND.

New 17" Two-Spindle Drill Presses



\$224²⁵

With No. 2 Morse Taper Spindles, less motor.

The heads of this drill press with the streamlined guards completely covering the spindle pulleys and belts, are of the same design that has proved so popular in the previous models. Heads are interchangeable, so that either two spindles with No. 2 Morse tapers, two spindles with Jacobs chucks, or one of each type can be used on the machine as desired. Spindles also may be quickly interchanged without changing heads.

Overall dimensions 29½" x 41½" x 48" high. Table surface 23½" x 36". Center to center distance between spindles 18". Column diameter 3½"; column of heavy-walled tubing, ground and polished to close tolerances. 1½" oil trough, drilled and tapped at rear for ½" oil-drain pipe.

Large spindle pulleys carried on two self-sealed ball bearings. Bearings take all belt loads, so that none are transmitted to spindle.

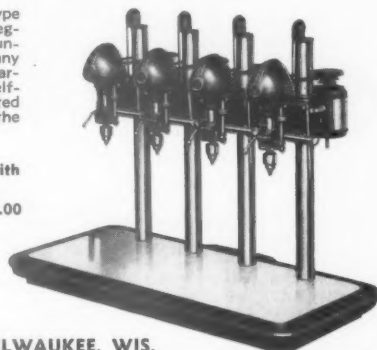
Exclusive inverted-spindle design, with automobile-type 16-tooth spline drive and floating spindle sleeve. Spindles carried in New-Departure self-sealed ball bearings. All ball bearings are lubricated at the factory, and require no further attention or lubrication during their entire life.

Speeds: 385, 600, 935, 1450 and 2240 r.p.m.

New 14" manufacturing type Four-Spindle Drill Presses. Regular Delta quality at Delta's unusual low prices. Have many special features. Spindle carried on New Departure self-sealed ball bearings—lubricated at factory for the life of the bearing.

No. 1001 (Illustrated) with Jacobs chucks, less motors \$245.00

Write for name of nearest dealer and special circular giving full details.



Delta Manufacturing Co.

657 E. VIENNA AVE. MILWAUKEE, WIS.

Dynamic Balance



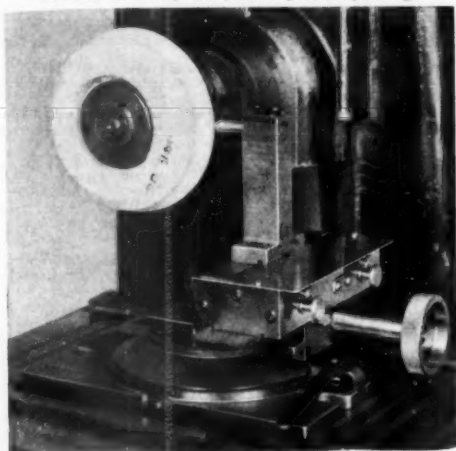
RIVETT attains real precision for the enclosed bench lathe with "Dynamic Balance" of every rotating part. Spindles are rigid and vibrationless at all speeds. Other standard characteristics for lasting precision are:

maximum slide areas, three-point mounting and slide rest shoe which always squares with center line. Operating features of value are: splash lubricated speedbox drive, standard constant speed motor giving 18 spindle speeds, replacement of driving belts without disassembly of spindle or removal of head, and hinged cover to permit turning of spindle by hand.

RIVETT LATHE & GRINDER INC.
BRIGHTON, MASS., U. S. A.

VINCO ANGLE TANGENT TO RADIUS DRESSER

for Internal, External and Surface Grinding Machines
Patented June 5, 1934, other patents pending.



One of the outstanding features of The Vinco Dresser is the basic patented principle of dressing angles and radii on abrasive wheels from the same axis without moving the diamond, angles and radii are always accurate and tangent. The illustration above shows The Vinco Dresser in use on a surface grinder dressing angles and radii on an abrasive wheel. The Vinco Dresser is precision made by highly skilled mechanics. Dresser parts subject to wear are hardened, rough ground, normalized, finish ground and lapped. Stops on the Index Plate permit the setting of the Dresser at any desired angle for production grinding. The Vinco Dresser will save you 75 per cent in dressing costs and eliminate all your worry. It is fully guaranteed to be satisfactory.

Send for Descriptive Circular.

VINCO TOOL COMPANY

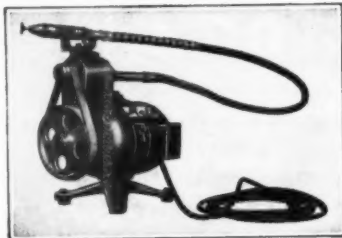
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for Every Polishing, Grinding,
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MALL 1/2 H.P. diesinking unit. Can be furnished to operate from 3450 r.p.m. to 14,000 r.p.m. The ideal machine for rotary files and shaped grinding wheels for removing burrs after machining, countersinking holes, and for finishing molds and dies.

TODAY countless operations that previously required tedious hand work are performed with speed and ease by the use of MALL machines and MALL grinding wheels and rotary files. They save money and time in pattern, die and mold making, sharpening taps, dies, and other tools. Every shop will find a wide variety of uses for MALL machines and attachments.

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Lincoln Foundation Prize Contest Offers Tool Engineers Share in \$200,000 Awards

J. C. Lincoln, Chairman of the Board of Directors, of the Lincoln Electric Company, Cleveland, Ohio, has announced "The Lincoln Arc Welding Foundation," which is sponsor to an Arc Welding Prize Contest offering rewards totaling \$200,000.

"The object and purpose of this foundation," states a brochure, just issued, "is to encourage and stimulate scientific interest in, and scientific study, research and education in respect of, the development of the arc welding industry through advance in the knowledge of design and practical application of the arc welding process, and to provide for the payment of awards, by prizes, to those persons who by reason of the excellence of their papers upon said subject may be selected . . ." The complete rules, conditions and details of the contest are fully described. The contest embraces practically every field of industry where arc welding can be applied to manufacture, fabrication or construction. Each of these fields or classifications are subdivided into two or more sub-classifications, thus providing contestants literally thousands of subjects that they can select for their papers.

Of special interest to Tool Engineers is the classification on "Functional Machinery: Jigs and Fixtures." This classification provides 54 prizes totaling \$25,300. A paper on jigs and fixtures is as likely to win the contest Grand Prize of \$13,000 as a paper on any other subject. In addition, papers on Jigs and Fixtures may share in the four main prizes of the contest—totaling \$26,000.

Readers who wish to receive a copy of the \$200,000 Prize Contest brochure may do so by addressing The James F. Lincoln Arc Welding Foundation, P. O. Box 5728, Cleveland, Ohio. Your request, mentioning "The Tool Engineer," and addressed to the personal attention of Mr. A. F. Davis, Secretary, will receive prompt attention.

Banquet of Graduate Apprentices of the Brown & Sharpe Mfg. Co.

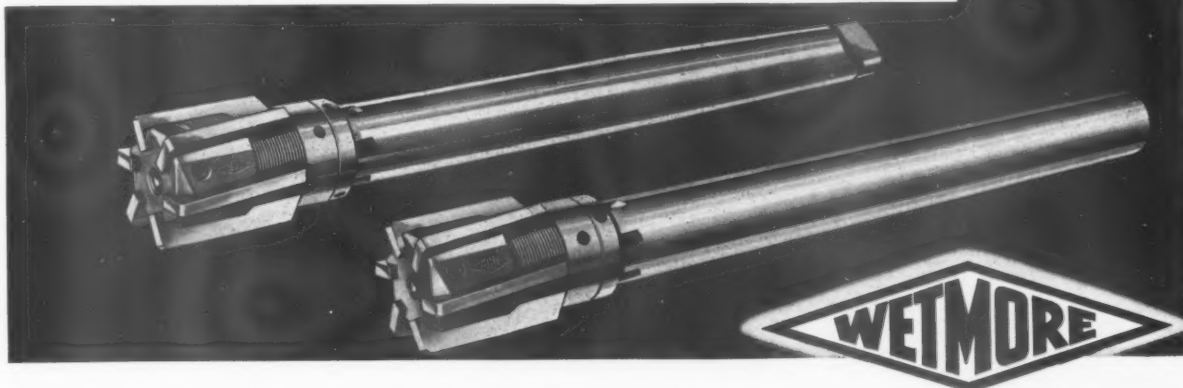
To those who sigh for the good old days when boys were trained to useful trades, the banquet of Brown & Sharpe graduate apprentices, recently held at the Biltmore Hotel, Providence, R. I., may initiate a move to revive this system. For, the fact remains that the world needs trained men more than ever, and B. & S. is doing its share to supply that demand.

About three hundred Brown & Sharpe graduate apprentices attended this first general gathering, many of whom are now located outside of the B. & S. plant—Massachusetts, Connecticut, Vermont, New York, New Jersey and Illinois being represented besides Rhode Island. Many, now, are major executives.

Davis Arnott, Chairman of the Banquet Committee, gave the welcoming address, with Benjamin P. Graves, Director of Design at Brown & Sharpe, toastmaster. Ralph E. Flanders, President of Jones & Lamson, Springfield, Vt., was the principal speaker of the evening, with other addresses by Judge Ira Lloyd Letts and Henry D. Sharpe, President and Treasurer of Brown & Sharpe, Chas F. Northup, Machinist '84 and second oldest graduate, now B. & S. Representative at Syracuse, also addressed the gathering. The oldest graduate attending was Frank H. Lord, Machinist of '82.

THE STANDARD OF QUALITY AND ACCURACY IN ADJUSTABLE MACHINE REAMER

The Type No. 11 Wetmore Reamer is known for ease of adjustment, long blade life, cutting performance . . . because of the famous Wetmore design. Write for Catalog No. 36.



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Designers and tool engineers are invited to avail themselves of our counselling service on all reaming operations—standard or special. We build practical and efficient special tools to decrease your manufacturing costs.

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"SURE CLAMP" one of 11 types of standardized fixtures included in the Q-C LINE

For utmost simplicity, ruggedness, and long life this type of fixture is unsurpassed. Equally suitable for either low or high production.



Tooled for Boring Articulating Rod

No effort to operate. $\frac{1}{4}$ " spring follow up.

Bushing plate adjustable for height.

Right or left hand operation.

Cost less than the most temporary fixture.

Clamping pressure adjustable from zero to 1000 lbs.

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ENGINEERING CO.** FRANKENMUTH, MICH.

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YOUR OLD WORN OUT MILLING CUTTERS,
SAWS, ENDMILLS, DRILLS AND REAMERS

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No single factor in production is more important than the quality of service rendered by cutting tools. Gairing tools are used in plants where there is a constant lookout and reward for ability to do a superior or special job better than before and where efficiency and long life in a tool are fully appreciated.

Standard and special design cover a very broad range of machine applications. Consult our Engineering Department for details. Special tools to your blueprints, or specifically designed to meet your needs, are available.

Years of accumulated experience in the designing of standard and special cutting tools is at your disposal without obligation. Write for a catalog of the Gairing line on your company letterhead.

Gairing representatives are located in all the important industrial centers.

Manufacturers of

STANDARD and SPECIAL CUTTING TOOLS and TOOL HOLDERS . . . Counterbores and Countersinks . . . Counterbore Sets, Spotfacers . . . Core Drills, Reamers, Hollow Mills . . . Full Floating Holders, Facing Heads . . . Form Cutters, Boring Bars, Boring Heads . . . Adjustable Extension Holders . . . Multi-Diameter Cutters . . . Tungsten Carbide Tipped Tools.

THE GAIRING TOOL CO.

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Newark Organizing A.S.T.E. Chapter

Word has reached Detroit that the stage is being set for the first meeting of a group of manufacturing executives and Tool Engineers in the Newark, New Jersey area for the purpose of organizing a branch of the American Society of Tool Engineers.

Those readers of this publication and any interested manufacturing executives in the vicinity of Newark are cordially invited to attend this meeting which will probably be held early in May. Mr. Herbert D. Hall, 41 Belmont Avenue, N. Arlington, New Jersey has been making the arrangements and is in charge of the organization work. All interested parties should communicate with him.

Fifth Mailing A.S.T.E. Standard Tool Engineering Data Sheets

The fifth mailing of the Standard Tool Engineering Data Sheets created by the American Society of Tool Engineers Standards Committee was dispatched from A.S.T.E. National Headquarters in Detroit on April 22nd.

Sixteen sheets were included in this mailing and all members whose 1937 dues were paid will receive these data sheets.

Detroit Student Chapter Elects Officers

The A.S.T.E. Student Chapter, at the Detroit College of Applied Science, held its monthly meeting April 15th. This meeting, attended by forty of the total membership of seventy, was a hilarious occasion which inaugurated the first of a series of "Scotch Banquets." The scotch banquet does not pertain to scotch and soda, but consists of beer, pretzels, potato chips, etc. and a general collection is taken up after the meeting which usually nets the Chapter a profit.

Officers for 1937 were elected as follows: Chairman, Joseph Barnett; Secretary, Margaret Cecil; Treasurer, Raymond Murphy; Meeting Chairman, Cass Carson; Entertainment Chairman, Andrew Luptak; Publicity Chairman, Jack Grant, and Athletic Chairman, Bill Bilenky.

The May meeting will be held May 20th at the Detroit College of Applied Science at 8:30 P.M. A debate, "Resolved that the Sit-down strike is a Benefit to Labor" with affirmative and negative teams of eleven men each will be a feature of the evening. Charles F. Staples, Chairman of the Detroit Chapter will also speak on the subject "Boring."

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--PIERCING WITHOUT A PRESS--

This new method of piercing assures you of—

1. A more uniform product.
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5. Costs comparable with die costs.
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The illustration shows a radiator shell, with all reinforcements welded in place, being completely pierced with nineteen Hydro-Pierce units, each bearing one or more punches, and driven by a power-plant suspended under the ceiling out of the way.

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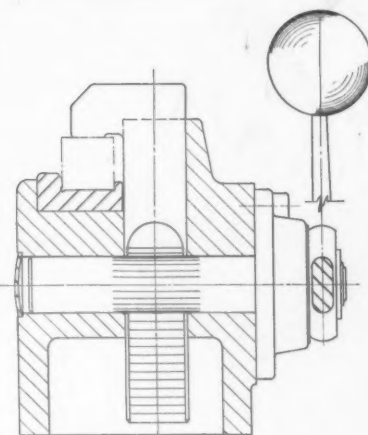
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Rack and Pinion is a commonly known design to get a desired locating or clamping action.

Hold that action in place with a locking device self-contained in a SWARTZ LOCK keyed to end of pinion shaft. Applied pressure held intact until manually released by reverse action of handle.

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Gage blocks, height gage and dial indicator check the accuracy of these special parts.

They provide the easiest and quickest method for either simple or complicated layout and checking work. • You don't have to purchase a set. Prices for individual blocks, accurate to $\pm .000008$ inch, start as low as \$3.50. A post-card will bring you the new Johansson Catalog.

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Keep your A.S.T.E. Standard Tool Engineering Data Sheets in perfect order—instantly available when you need them. The three ring, hard bound, imitation leather, handsome binder—imprinted with your name in gold on front cover—may be had for \$1.25 plus postage. Write A.S.T.E. headquarters, 5928 Second Boulevard, Detroit, Michigan for your copy, now.

A.S.T.E. Pins

All members may buy A.S.T.E. pins at the National office or through their Chapter Secretary at a cost of \$1.00 for the Gold Filled or \$2.00 for the 10K pin.

Ingenuity of Tool Surpasses that of Product

The following is quoted from an article which appeared in the January 30, 1937 issue of AUTOMOTIVE INDUSTRIES, and, of course refers to Mr. Cameron's talk given before The A.S.T.E. in Detroit. "TOOL ENGINEERS—Several weeks ago, W. J. Cameron—he of the Ford Sunday Evening Hour—gave an interesting and inspira-

tional talk at a banquet gathering of the A.S.T.E. The gist of it was an elevation of the art of Tool Engineering. And true it is, as Mr. Cameron said, that the beauty and complexity, and technical ingenuity encompassed in the modern tool far surpasses that of the product it brings into the world. It took one of the best speakers of our industry to make vocal the intrinsic worth of a branch of engineering which has not yet had its full share of credit for technical achievement. —J.G."

Minneapolis To Be Chartered May 6th

Just as this page goes to press comes word from Donald G. McKay of the Minneapolis Honeywell Regulator Company, Minneapolis, Minnesota—A.S.T.E. member, formerly of Milwaukee chapter—that arrangements have been completed for a formal installation meeting for an A.S.T.E. Chapter in Minneapolis. On this occasion one of the National Officers of the American Society of Tool Engineers will be present to install and charter the Chapter.

Readers of THE TOOL ENGINEER and others interested in the Twin City area are invited to communicate with Mr. McKay and to attend this meeting.



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YOUR MILLING PROBLEMS

THE EKLIND UNIVERSAL MILLING DRILLING and BORING HEAD

Is Just The Attachment You Need!

The quill may be fed to depth at any angle—then locked for succeeding milling operations.

- Correct speeds for end mills ($\frac{1}{16}$ " - $\frac{3}{4}$ ") and boring bars to $\frac{1}{4}$ ".
- May be adapted to all your milling machines and other tools, such as boring mills and planers.
- 4 inch quill feed thru worm or rack.
- Ideal for DIEMAKERS (duplicating attachments available).
- Rigidly mounted (3" dia. quill, spindle 22" long).

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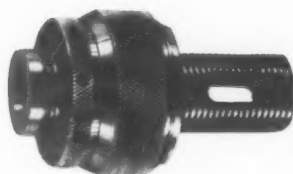
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Buhr MICRO-ADJUSTABLE HOLDERS & NOSE PIECE

For drilling, reaming, spotfacing and counterboring operations on drill presses, clusterheads or turret lathe.

No wrench is required to adjust or lock. A slight turn to right or left of knurled locking sleeve locks or unlocks the adjusting nut, which gives a measured adjustment of one thousandth of an inch.



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The modern trend in speed, accuracy and in reduction of manufacturing costs is continuously increasing the application of broaching.

We invite you to take advantage of the service of our engineering staff.

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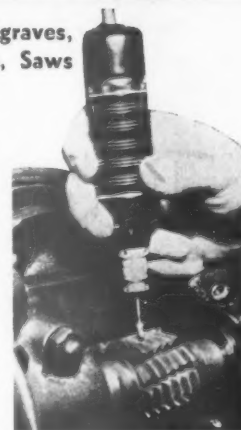


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Finest, speediest, most powerful tool for its type. 25,000 r.p.m. AC or DC, 110 volts. Weighs only 12 ounces. No shop or factory can afford to be without the Handee. Try one.

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Furnished on "Proconier"
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He will tell you—
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weight permits more

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tion. Eliminates inertia set up by the ordinary heavy tap
holders—saving tap breakage. Gives more accurate
results and better service."

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Proconier Safety Chuck Co.

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Chicago, Ill.

Production Perspectives

(Continued from page 18)

makers and die makers in Bridgeport. It is stated that Bridgeport manufacturers could give employment at once to several hundred skilled workers in these classifications, but there are none to be hired. On April 17th Elmer H. Neff, M. E., completed his fortieth year with Brown & Sharpe. On that anniversary he relinquished charge of the New York City office and retired from active service. Brown & Sharpe's New York City office will be under the direction of Mr. Arnold K. Brown.



New plant of the
Chas. L. Jarvis Com-
pany, Middletown,
Connecticut

The Charles L. Jarvis Company, Middletown, Connecticut, has acquired new plant facilities of modern construction and embracing 31,000 square feet of floor space. It is air conditioned, additional equipment has been added including a gas fired heat treating furnace. The company manufactures tapping attachments, rotary files, flexible shaft equipment . . . Reading, Pratt & Cady Co., Hartford has made plans for a two-story factory building. . . William H. Miller, 67, manager of the agency sales division of Pratt & Whitney Division of the Niles-Bement-Pond Co., and associated with Pratt & Whitney for 47 years, died suddenly March 26 of a heart attack.

SHELDON ARBOR PRESSES and VISES



Arbor Presses
12 Sizes
From ¼ to 10 ton
Pressure



**Plain and Swivel
Milling Machine Vises**
4 Sizes
3½ to 8½ inch Jaws



Shaper Vises
2 Sizes
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Drill Press Vises
3 Sizes
4½-6½ and 9 inch Jaws

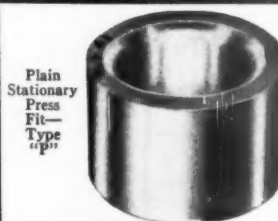
Ask for No. 25
Catalog and
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Stationary
Press
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Should-
ered
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Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

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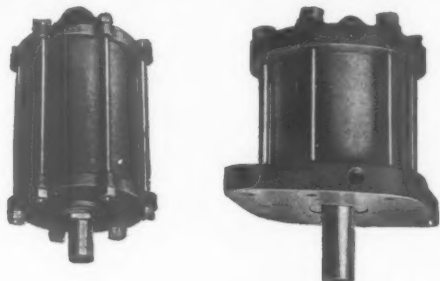


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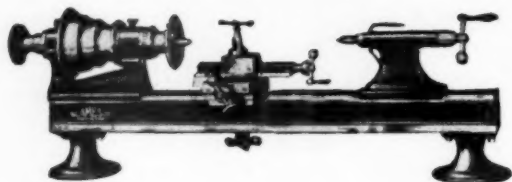
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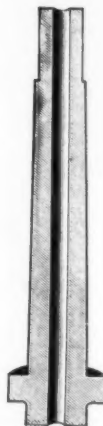
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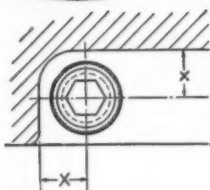
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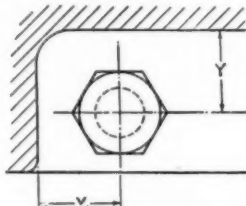
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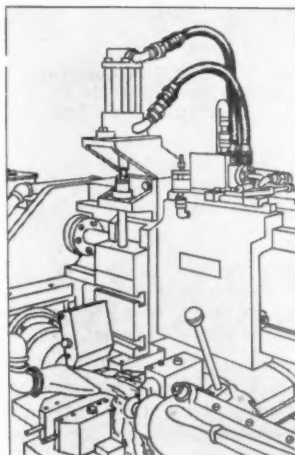
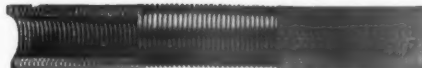
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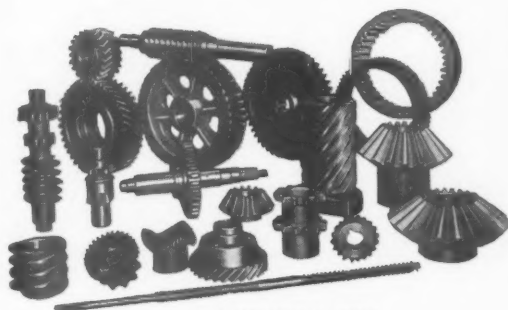
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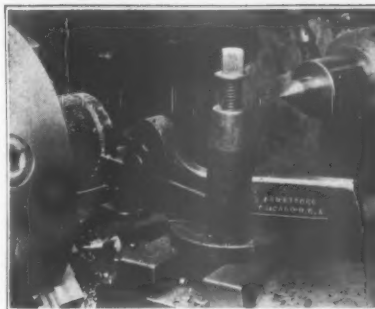
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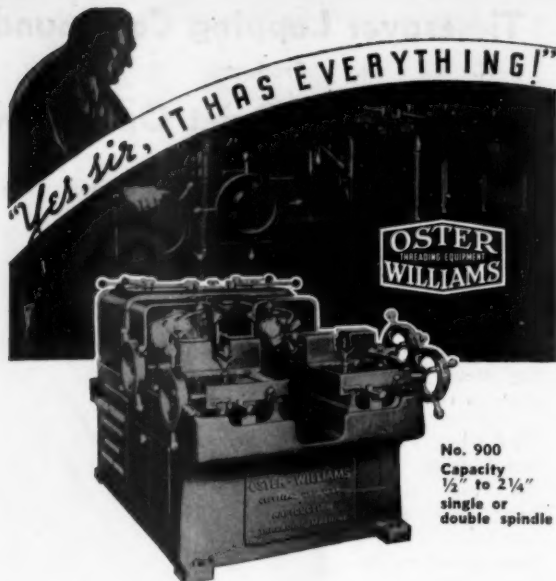
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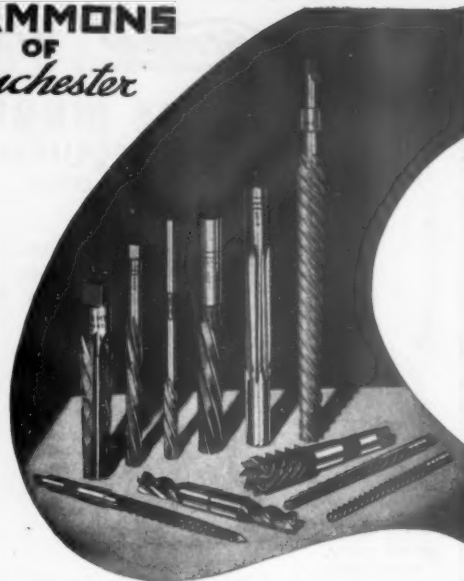
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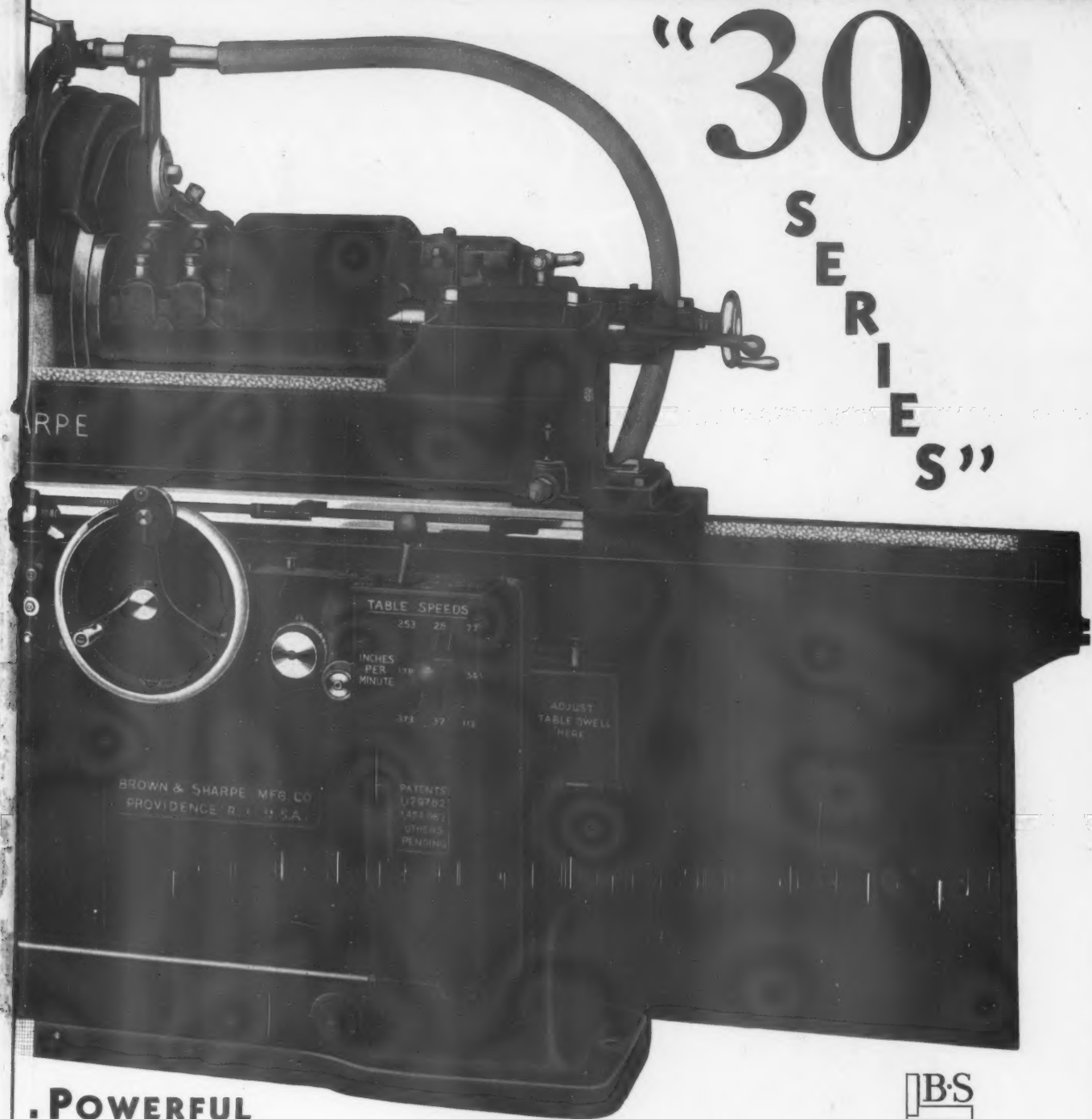
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